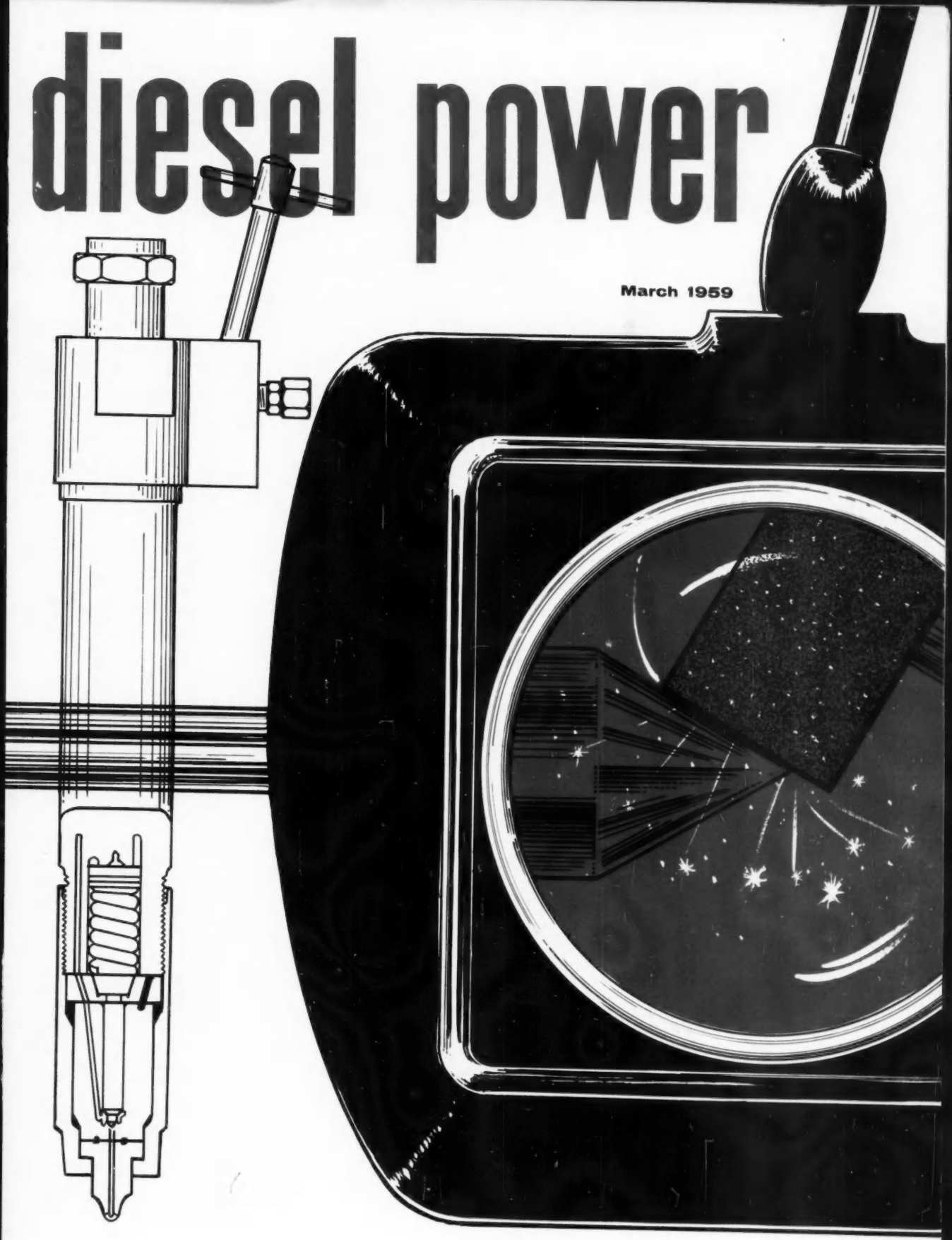
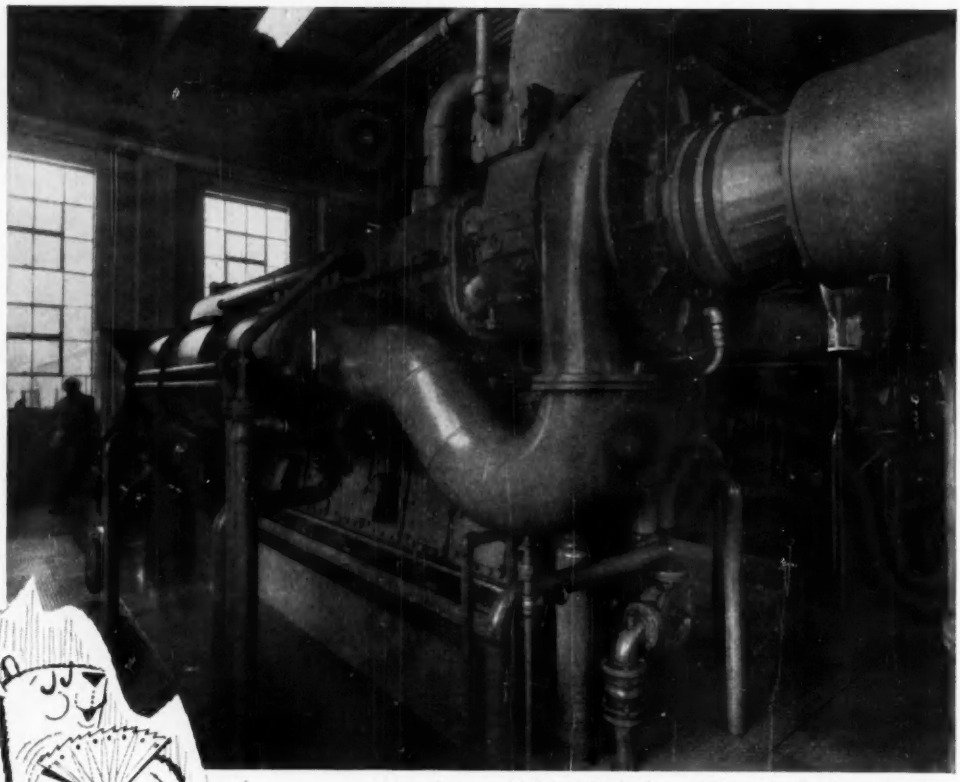
diesel power

March 1959





Cooper-Bessemer Tri-Fuel Turbocharged Type JS-8 Engine at Hominy, Oklahoma. Operates as supercharged, spark-ignited gas engine ...gas-diesel...or full diesel. Rated 1425 hp at 450 rpm.

Cooper-Bessemer engine chills its combustion air... shrinks fuel costs

The City of Hominy, Oklahoma, is piling up cool savings by boosting fuel efficiency with the Cooper-Bessemer 1425 hp engine shown above. Equipped with a combustion air cooling system, to pack more air . . . more oxygen . . . into the engine, this JS8 engine is setting an exceptional record of fuel economy of 6200 Btu/bhp/hr.

When planning expansion for its power plant, it is understandable why Hominy turned to Cooper-Bessemer for dependable, low-cost performance. A previous JS engine of 986 hp rating ran 60,000 trouble-free hours before its first overhaul.

To make sure that you get the latest power advancements for your expansion or modernization, consult Cooper-Bessemer when you start to plan. Contact the nearest office for complete information.

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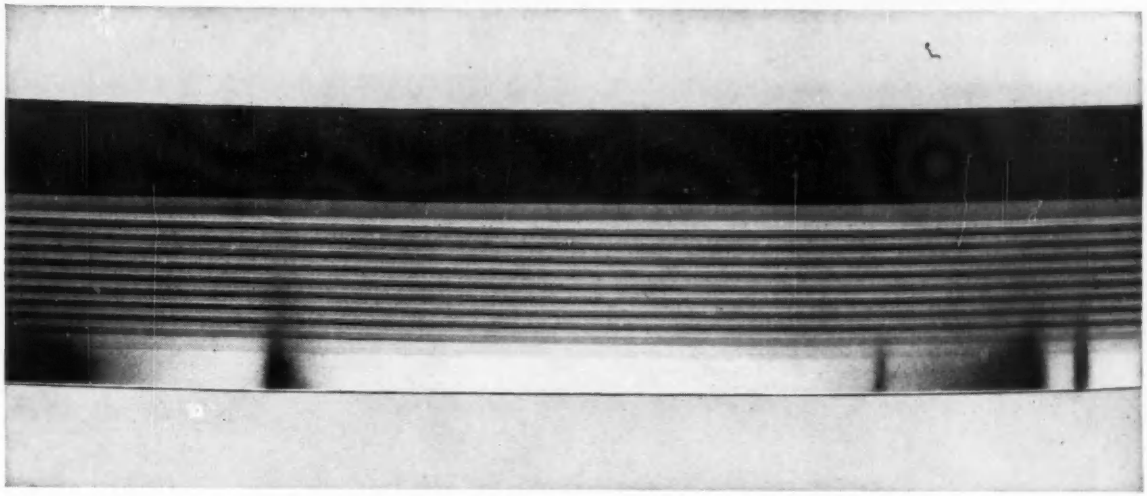
with factory pre-seated full chrome PEDRICK PISTON RINGS



Bright highlight along lower face of ring shows area pre-seated by factory lapping.

Use of PEDRICK Chrome Piston Rings reduces break-in time by as much as 80% . . . allows the engine to be put under full load very quickly. This is because PEDRICK laps or pre-seats its Chrome Rings to cylinder size *at the factory*. PEDRICK Chrome Rings are the most modern twist-seal and/or taper face designs, which further speeds seating and helps provide a quick, positive seal.

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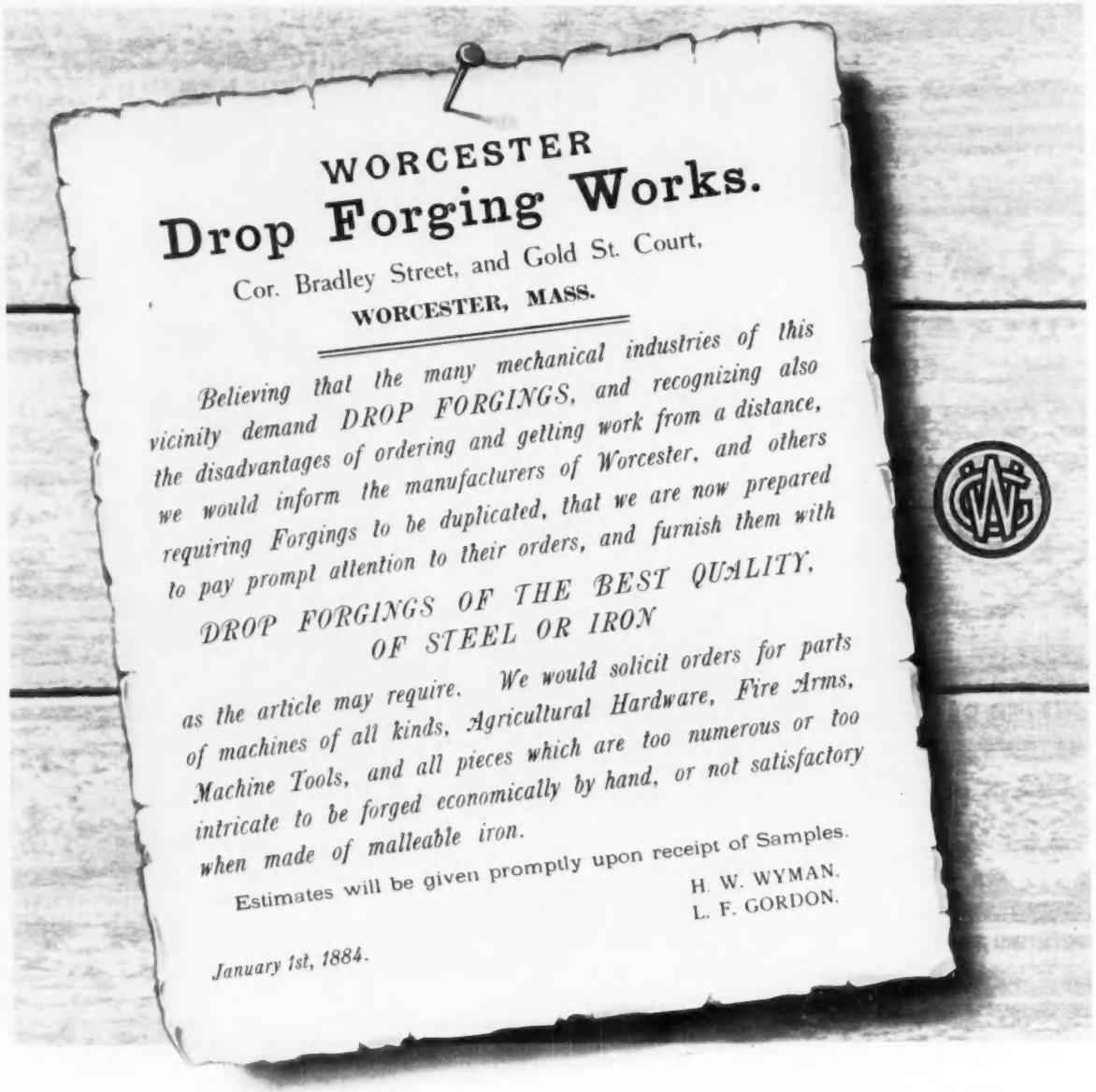
PEDRICK PIONEERED CONFORMABLE PISTON RINGS FOR BIG-BORE ENGINES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L. F. GORDON.
January 1st, 1884.

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Today, after seventy-five years, Wyman-Gordon is still "prepared to pay prompt attention" to *your* orders and to furnish "forgings of the best quality," not only of steel, but of light alloys and all of the new exotic heat-resisting materials including beryllium.

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Check these outstanding features:

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Please send me more information on JLO Series air-cooled diesels and the name of my Hercules distributor.

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Harrison-Cooled Ground Power Unit Provides Pre-Flight Power For Radio, Air Conditioning, Lights and Starting!

Harrison Heat Exchangers —Top-Quality Products of General Motors Research and Engineering.

Resting on the ramp, getting ready for intercontinental flight . . . this giant B.O.A.C. commercial plane keeps its vital systems working with power from this Harrison-cooled, Diesel-driven ground power unit. And when it's time to roll, this same unit delivers dependable power to start the turbo-prop engines. Such power creates *plenty* of heat, but Harrison oil coolers keep operating temperatures under control. Every Harrison heat exchanger is the product of over 48 years' experience . . . assuring you of top quality and engineering excellence. That's why you'll find Harrison at work cooling Diesels in every line of industry and defense. If you have a cooling problem, look to Harrison for the answer.

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TEMPERATURES MADE TO ORDER

AIRCRAFT, AUTOMOTIVE, MARINE AND INDUSTRIAL HEAT EXCHANGERS

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

editors notes...

You'll want to read about...

Results of a recent survey on what it takes to make a good fuel injection equipment repair shop. How does the shop you're using stack up in equipment, know-how, results? (Pg. 12) . . . .

Amazing savings in time and money possible through automation, modern equipment such as computors, tooling and procedures. No business is too small to benefit (Pg. 16).

An exciting new incentive training program, Detroit Diesel's GM Service Craftsman Guild. This is another sign that our industry is really growing, following the pattern of the automotive field.

Is your maintenance program costing you money? Could be. A survey of engine failures and accidents shows that over half were due to an inadequate maintenance job. How does your program score?—you can check on page 24 . . . .

Aimed smack at heavy duty oil field service, White's new PTDS-6M diesel unit is a simplified, compact unit in 450-550 hp range. (Pg. 26)

Track costs up? Track life depends on many factors—may be causing serious damage to the drive line clear back to the engine. Here is advice on how you can cut those costs—let's talk track! (Pg. 28)

diesel power

Established in 1923 **Vol. 37, No. 3** **March, 1959**

The Magazine of Piston and Turbine Power

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A Word to the Sufficient is Wise 9

Articles

Fuel Injection Repair Shop—Good Business or Boobytrap 12
Modern Methods Benefit Firms and Their Customers 16
GM Forms Service Craftsman Guild 21
Your Maintenance Program—Good or Bad? 24
White Announces New PTDS-6M Oil Field Diesel 26
Let's Talk Track 28
Safety Control Switches Give Full-Time, Low Cost Protection 32
Express Goes Diesel 33
Steam Speeds Liner Removal 34
Radiator or Cooling Tower 36

Departments

Highlights 11
Service Section 38
Industry News 40
New Products 44
People and Plants 48
New Literature 52
Advertisers Index 58

Diesel Publications, Inc., 80 Lincoln Avenue, Stamford, Conn.

You'll want to read about...

Safety control switches that can save you the cost of a new engine. These engine sentinels are on duty 24 hours a day—pay for themselves first time the switch trips. (Pg. 32)

Diesel power takes over another express company. Kenworth-Cummins Model T-522 replaces gasoline engine trucks at Southern-Plaza Express. (Pg. 33)

Ever had trouble pulling liners from aluminum blocks? New steam method speeds operation either on the rebuilding stand or in the chassis—see page 34 . . . .

Cost of cooling—which is best for your installation, cooling tower or radiator? Choosing involves both engineering and cost factors. Find out about it on page 36 . . . .

Our reader service guide is yours to use—check the Departments in this issue for items of interest to you. Next month be sure to read our annual engine specifications issue plus many other features.

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Highlights 11
Service Section 38
Industry News 40
New Products 44
People and Plants 48
New Literature 52
Advertisers Index 58

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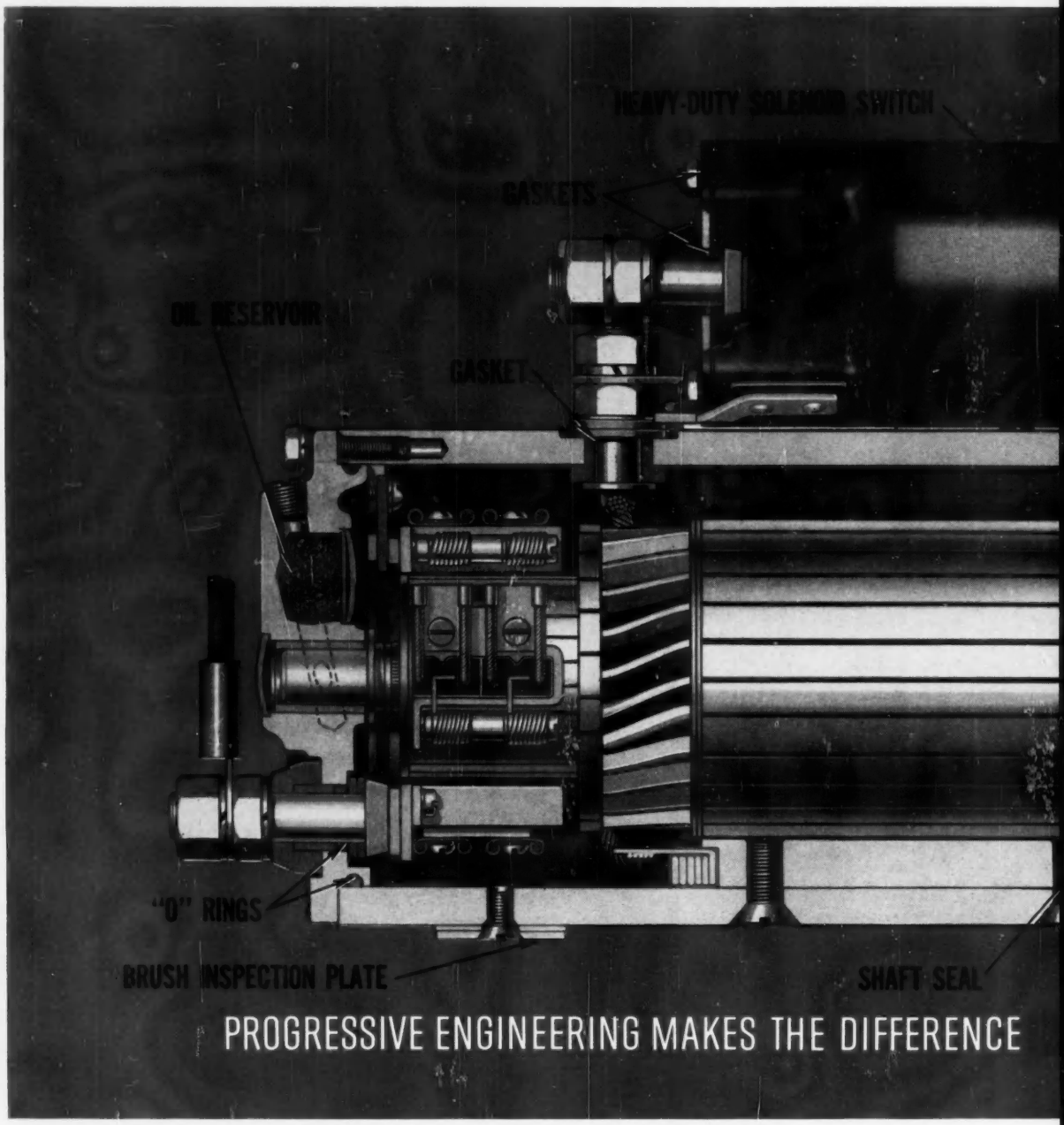
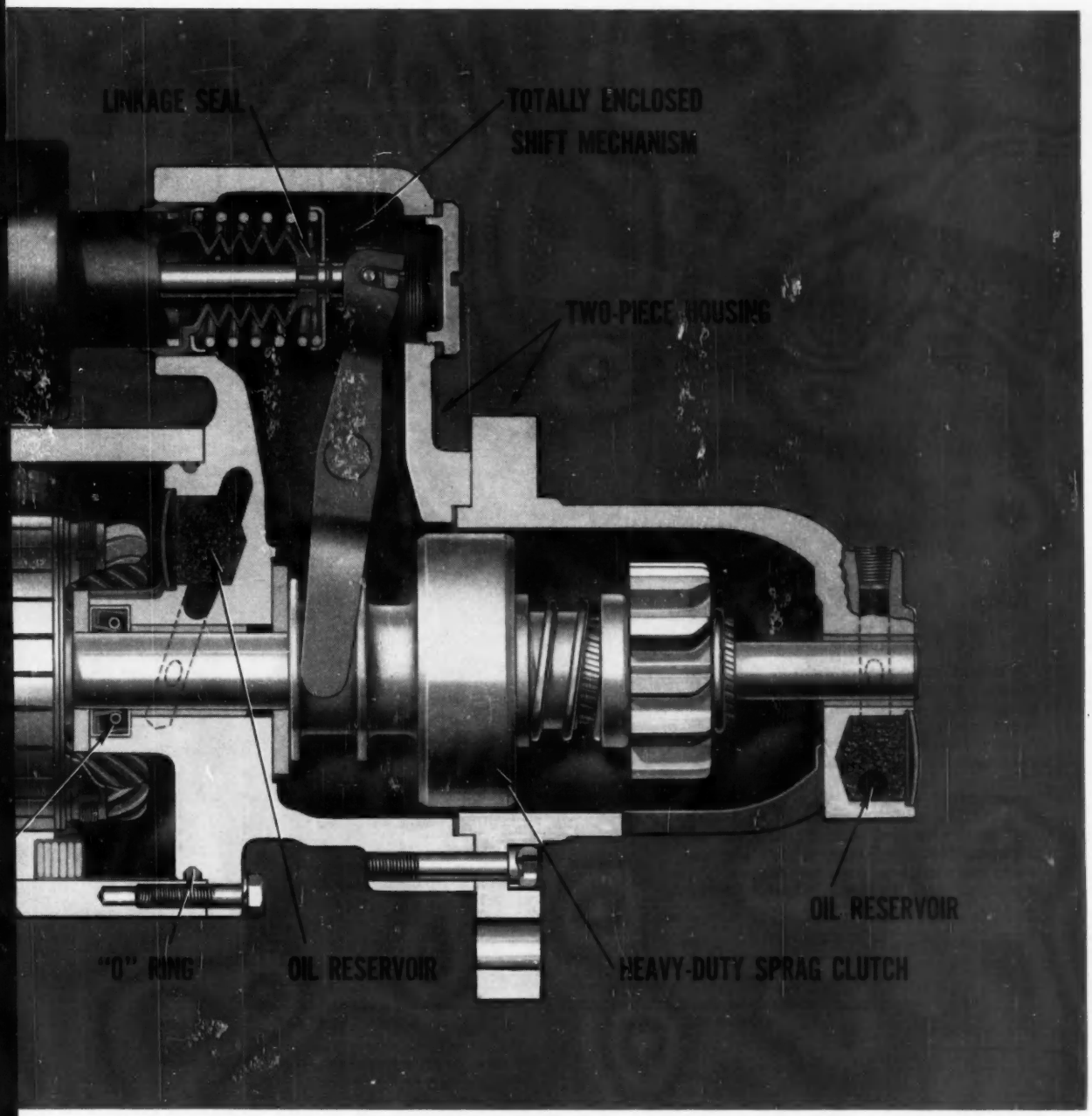


ANNOUNCING THE NEW DELCO-REMY TOTALLY

Delco-Remy now offers a completely new series of solenoid-operated, over-running clutch type heavy-duty cranking motors with the shift mechanism entirely enclosed. Special two-piece drive housings can be assembled to permit a total of 24 different solenoid positions with respect to motor mounting. New 50% longer brushes, together with sealing rings (optional) and large oil reservoirs (optional), assure extra-long operating time between overhauls. And Delco-Remy design features keep these heavy-duty cranking motors positively engaged until the engine starts. Engine manufacturers are invited to write directly to Delco-Remy for complete information and engineering assistance on the application of these new motors.

TOTALLY ENCLOSED DRIVE SHIFTING MECHANISM is protected against dirt, water, slush and ice. This enclosure plus the shaft seal and linkage seal also prevents transmission oil leakage.

TWO-PIECE DRIVE HOUSING DESIGN permits 24 different solenoid positions. Nose housings available in S.A.E. #2 and #3 mountings.



ENCLOSED HEAVY-DUTY CRANKING MOTORS

HEAVY-DUTY SOLENOID AND SWITCH provide positive pinion engagement and safely handle maximum starting current. Special seals increase contact life.

SPRAG CLUTCH DRIVE operates with non-chamfered ring gear. Pinion indexes on spiral spline, positively engages ring gear before power switches on, and does not become disengaged with sporadic engine firing.

HEAVIER BRUSH INSPECTION PLATES resist damage from use and handling—are sealed to prevent leakage to motor interior.

GENERAL MOTORS LEADS THE WAY—STARTING WITH

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GM GENERAL MOTORS

ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

The Piston with "Double Bonded" "Ni-Resist Iron" Top Ring Section STOPS! RING GROOVE WEAR!

BOND-E-LOC*

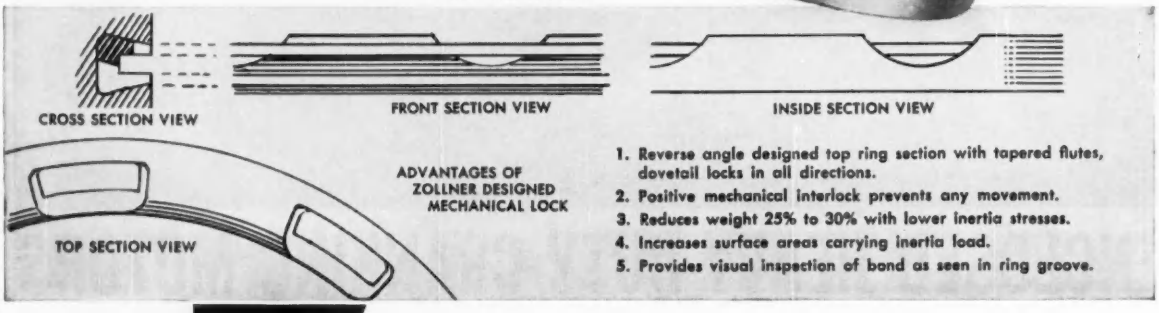
Exclusively DOUBLE BONDED
METALLURGICALLY Al-Fin Process
MECHANICALLY Zollner Lock

Licensed under Patents 2,396,730; 2,455,457; 2,550,879

Keeps Engines Powerful Longer — at Lowest Cost

"A sensational development — the greatest mileage piston we have ever used." Everywhere, engine builders and transport operators enthuse over the performance of Zollner Bond-O-Loc Pistons. Top ring groove wear problems are eliminated by the "Ni-resist" Iron section *permanently* incorporated with the double bond of *both* A1-Fin metallurgic *and the exclusive* Zollner mechanical lock. Separation failure is impossible. For longer piston life and lower maintenance cost, we suggest your immediate test of Bond-O-Loc advantages.

*T.M. Reg. Pat. App. For



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1. Reverse angle designed top ring section with tapered flutes, dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
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Editorially speaking -

A Word to the Sufficient is Wise

Last month's Editorial mentioned the Plymouth-Perkins cabs that are now available to taxi fleet owners. Studebaker now has two diesel models available, the Mercedes 180D and 190D. Note two important points. First, cab operators and others with use for diesel cars are offered not only availability but choice. Second, note that car manufacturers are making these vehicles available. This in itself is not remarkable; it's a matter of the implications. However, let's discuss these two points in order. There's a lot of difference between selling a conversion and a complete OEM package. That's one reason why our engine builders missed when they pioneered the conversion kit idea some 20 years ago. The second reason and probably the most important was that the economic pressures were not sufficiently severe. Not so in Europe where the bulk of taxis and light trucks have been diesel-powered for many years. Now, the operating cost squeeze is on here and the climate for acceptance is greater than ever before. It is also logical that with all the recent experience in Europe that their influence is felt in the first units introduced here. Now let's look at the second point. Automobile builders are also engine builders. As a market develops for diesel-powered vehicles, you can bet that all are going to get into the act. GM is already talking about it and has aimed their Series 53 engine right at it. Ford won't be far behind. A Ford cab is being converted with a Ford tractor diesel right now. This is a private operation but it shows what might be done. Looking long range, suppose that the Big Three form diesel departments. You know what happens—departments grow. Also, these companies have industrial sales divisions. Get the picture? Volume production, sales organizations—it could be tough competition. We've heard high-speed diesel builders say, "We're not interested in the taxi market." We say that they better be, whether they like it or not. Any time you leave an applicational vacuum, you invite others to fill it. Who can afford to encourage competition, particularly when the long-range implications are so clear?

BPE

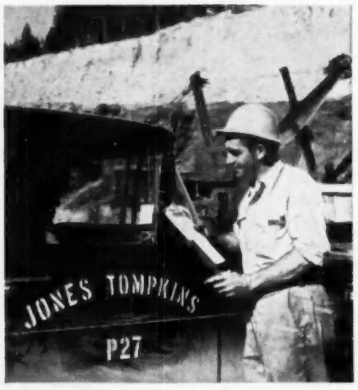
ENGINEER'S FIELD REPORT

PRODUCT **CHEVRON PRESSURE PRIMER SYSTEM**

FIRM **JONES-TOMKINS CO.** Cougar, Washington

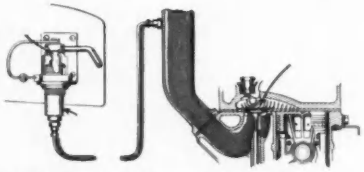
Special cartridge fires giant diesel in seconds

At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this $51,000,000 project. Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



Chevron Pressure Primer Discharger mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."

Why Chevron Pressure Primer System assures fast starts



- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at –65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

CHEVRON

TRADEMARKS "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey
STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

highlights

"We are losing parts volume to replacement manufacturers who undersell O.E.M. prices. Our profit is in parts—so look out!" was a most significant statement at recent regional confab of Associated Equipment Distributors. Long overdue, a long hard look at O.E.M. parts pricing policies?

More than 11-million barrels of crude oil per day will be processed by U. S. refineries according to predictions by oil industry economists says the API. This is double the 1950 rate.

Penn-Texas holdings in Fairbank-Morse, Chicago, will be over 84% if it exercises its option to acquire over 75,000 shares now owned by the Canadian Fairbanks-Morse Co. Ltd. Penn-Texas now holds about 77% of Fairbanks-Morse in Chicago.

Federal Highway Administrator Bertram D. Tallamy warns that the Federal highway program faces serious cutback in 1961 unless Congress acts to provide new financing. This could affect diesel sales, cut down usage of diesel equipment. Tallamy reports production now on unprecedented scale . . . projects completed since July 1, 1956 improved 3158 miles of interstate highway. Work on primary, secondary highways and their urban extensions also moving fast with 60,112 miles completed. Letter to your congressman urging O.K. of additional funds might help . . .

Local governments can benefit by supporting the Federal highway program . . . good example is San Diego, their Transportation Research Director, Edward M. Hall, at a recent convention of the American Society of Civil Engineers urged maximum implementation of the Interstate Highway Program as a means of resolving local transportation problems. Support of this program is a job for all of us . . . it means more jobs in our industry. What's happening in your community?

Japanese putting miniaturization skill to work in diesel field. Yanmar Diesel Engineering Co. of Osaka recently demonstrated two small air-cooled models with interesting weight specs . . . claims these are smallest commercial engines yet produced. Yanmar 3.5-hp unit weighs 66 pounds, 4.5-hp engine 88 pounds.

First of year figures from Association of American Railroads show 561 new diesel locos on order . . . 27,744 total engines now owned or leased by 43 railroads reporting. Steam and electric units on order—none.

Tests are reportedly being made on the use of a pulse jet to supply power to a turbocharger on a 2-cycle engine. Power is to be provided during starting and periods when exhaust gas energy to the turbocharger is insufficient for self-sustained operation.

Use of underground gas storage facilities, both natural or built, are increasing. The Federal Power Commission has granted the Natural Gas Storage Co. of Illinois, permission to build facilities for injection of natural gas in its underground Hersher storage reservoir in Kankakee County, Ill. The project will include a 1330-hp compressor plant.

As dieselization in the farm equipment field continues strong there is interesting news from J. I. Case Co. 1959 production schedules call for $135 million in farm equipment and $75 million in industrial products. At Case new equipment show in Nassau, B.W.I. dealers wrote $375 million in orders . . . the firm, expanding its industrial products line, introduced road-building scrapers and line of rear-engine, rubber-tired front end loaders for bulk handling. Prexy Marc B. Rojtman indicates sales in fiscal '59 rising to $210 million.

FUEL INJECTION REPAIR SHOP— GOOD BUSINESS OR BOOBYTRAP?

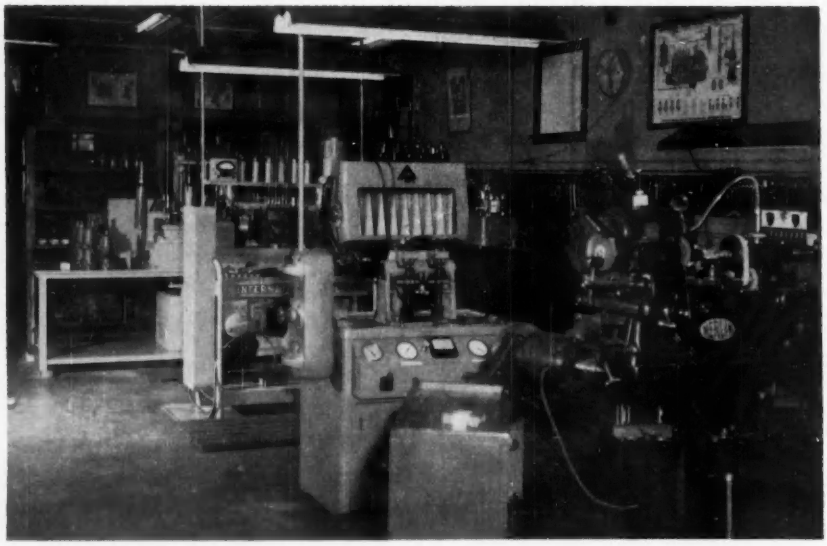
Results of recent survey bring to light some interesting facts about what makes a good fuel injection equipment repair shop.

FUEL injection equipment repair seems to be a field that always "looks greener". Two things are happening. First, a lot of men with limited background and little capital are starting small shops all over the place. Second, firms like the automobile companies and farm tractor builders, either through their industrial divisions or because of increased use of diesel power in their equipment, are talking and planning such shops as an adjunct to all their distributor and dealer shops.

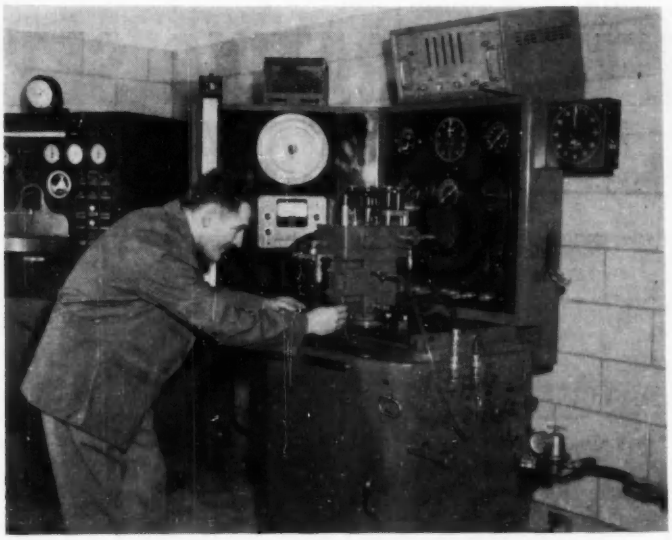
Pretty soon that "green" is going to take on a sickly hue. Here's why. First, it must be understood that this is not a crack at the honest, ethical man that is sincerely trying to do a job and get into a new field. He'll make it despite the tough sledding at the start. But lacking volume, access to OEM parts at trade discounts and the tough competition he'll face, temptation to cut prices, use questionable parts and cut corners is very strong.

Proof lies in the fact that a lot of them are doing it. This hurts the industry, the legitimate shop and the customer.

Wholesale establishments of in-



Only a portion of the Magneto & Diesel Injector Service shop in Houston, Texas. Equipment shown includes, foreground, needle grinder; two test stands for multi-plunger and distributor type pumps, and in the background a calibration stand for all individual type pumps.



Investment in equipment gets pretty steep. Hydraulic governor testing housed in special section at A&D Diesel Service shop, N. Y. Railroad governor on this stand must be accurately speed regulated. Additional to the basic stand is an electronic tachometer, manometer and sensitive pressure gauge and an electronic vibration analyzer.

jection repair facilities is another booby trap. There won't be enough work to keep the shop going steadily. There are two problems. First, the highly-specialized nature of the work does not lend itself to a part-time or casual approach. Second, test equipment and tools represent a high capital investment for low percentages of utilization. The result is that the cost of each job (quality must also be considered) is generally higher than if the work was farmed out to a qualified shop. Many cost-conscious engine distributors and dealers, even with their own injection shops, find it economic to farm out this work.

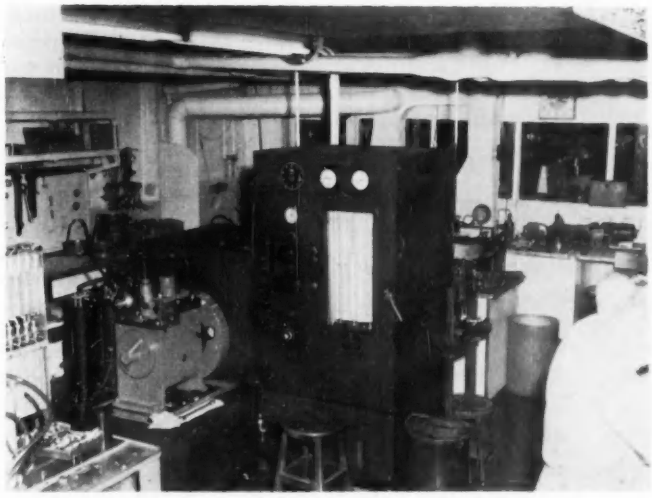
Considering a Shop?

A survey was made to determine some facts—facts to permit analysis of what it takes to have a successful fuel injection repair shop. The survey was made of the 76 service member shops of the Association of Diesel Specialists. They are representative of the best shops in the business. They are also dispersed throughout this country, Canada, Mexico and the Philippines and are thus representative geographically. Some are small, some are big. So they are a good cross-section for study.

Experience—These 76 shops represent 800 years in the business or an average of about 10.5 years apiece. A membership requirement is at least two years of continuous operation. Some have been established for over 30 years.

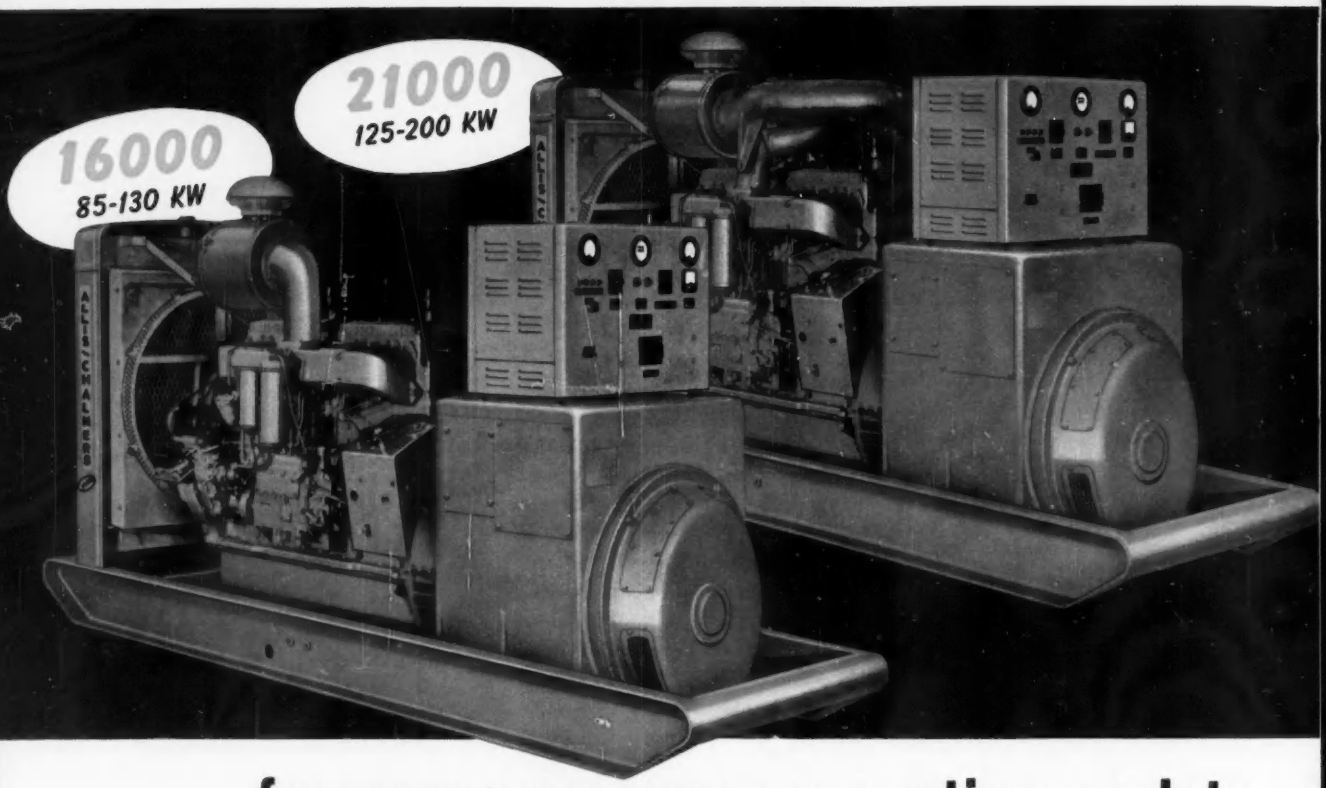
Skills—These firms employ 450 technicians or an average about six men per shop. These men work full time on injection equipment and governors. Members range from two in small shops to 28 to 30 men. Many are factory-trained. They have, or have access to, full specifications.

Space—Between shops and parts storage, over 165,000 square feet of space is devoted to diesel work. This



So-called "Atom Smasher" at Illinois Auto Electric Co., Chicago. Such specialized equipment means accurate in-the-field testing for performance and calibration of output delivery. Parts once visually rejected may now continue in service. Shop owner's investment of this type lowers users costs.

2 NEW DIESEL GENERATING SETS WITH BRUSHLESS GENERATORS



...for emergency power or continuous duty

Single manufacturer responsibility

Allis-Chalmers manufactures and stands behind these *complete* units — the modern diesels, the proved brushless generators, the electrical regulators and the switch gear. That means coordinated engineering, matched performance, undivided responsibility — an Allis-Chalmers exclusive.

Fast starts

The modern diesels, with their unique, controlled combustion, start and pick up loads in 4 to 10 seconds.

Precisely regulated power

The new Allis-Chalmers automatic static-type voltage regulator has no moving parts or contacts. No parts to burn or wear. It has unequaled quick response to sudden changes in load. Precise power regulation protects sensitive apparatus, easily picks up heavy motor starting loads.

Unequaled electrical reliability

The brushless generator has new simplicity. There are no slip-rings, no brushes, no commutators to wear or to spark. There's no radio interference, no danger of sparks that might ignite combustible fumes.

Fast, easy unit installation

These sets are simple, unit-type, self-contained. They are mounted on husky skids — no special foundation is required, no danger of misalignment. They slide easily into position in a boiler room or at a remote location. Electrical connections are simplified, too — speed installation and reduce related costs.

Your Allis-Chalmers dealer can give you complete specs, and assist in determining your needs. Call him or write, Allis-Chalmers, Milwaukee 1, Wisconsin.

BG-34

ALLIS-CHALMERS

POWER FOR A GROWING WORLD

A-C ALLIS-CHALMERS

averages to about 2170 sq ft per shop.

Inventory—Combined inventory—test equipment, tooling and parts—adds up to over 4-million dollars or $52,600 per shop. This, of course, varies with the size of the shop from about $10,000 for the 2- or 3-man shop to a figure approaching one-half million dollars for the larger ones.

Customers—These shops serve over 21,000 customers. Again, as an average, this is 276 customers per shop. There is no correlation between shop size and number of customers. For example, a large shop may have relatively few accounts but these may be major railroads.

Spotless cleaning section of Gerhardt's, Inc. in New Orleans. Efficient cleaning is a must, but another expensive operation requiring various solutions for use on different parts. Small push carts are convenient for moving quantity of small parts.

Rounding Out the Picture

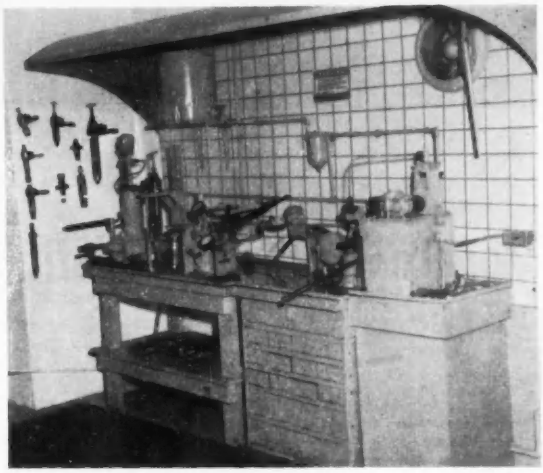
In correlating this data, totals as well as ranges have been given. The pictures illustrate some different types of equipment in a few of these shops. The amount and type of tooling required will, of course, depend on the intent and scope of work. One point is clear: It is not a business to be entered lightly.

A second point involves economics. Even the minimum facilities require considerable investment. This amount must be amortized over the useful life of the equipment by a charge against each job done during this period. To this must be added normal overhead, labor costs and profit.

Figure it out: that's the true cost of the job. With low volume, you may well find that the job is costing you more than you can get it done for.

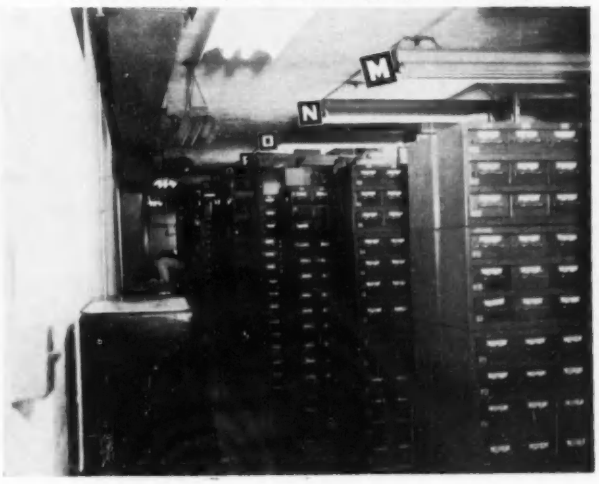
This is why many engine distributors and dealers are farming out their work. It's why wholesale setup of injection repair facilities in each little dealer's shop can be uneconomical.

Now for a word to the customers. You can't beat economics; each job properly done costs so much. If you think you can buy it for less, the shop doesn't know its costs and is going broke; it is using inferior, cheaper parts; or it is cutting corners on the quality of the job.



Test equipment for all types of nozzles at Diesel Fuel Injection Service, of St. Louis. Note automatic run-in stand at right, hood and vent capture end exhaust and oil vapor.

Parts are stored and perpetually inventoried at Diesel Injection Sales & Service in Norfolk, Va. Storage area must be kept clean and parts protected from chipping and scratching.



Speeding parts to the user is the by-word at Clark's Central Parts Division. This 468-foot conveyor belt carries parts from bins to packers, emergency orders going into special metal containers.

Modern Methods Benefit Firms And Their Customers

From transmitters at dealerships, parts orders are flashed over Clark's 13,000-mile private wire communication network to Teletype machines at Central Parts Division.

Machinery and methods in many companies making the most modern products are actually primitive. The sales pitch so successful with customers just hasn't penetrated the home grounds. This is a sad state of affairs considering the amazing savings in time and money that automation, computors and other modern equipment, instruments, tooling and procedures are giving. Among other benefits gained, especially through use of computors and automated systems, are customer good will and elimination of human errors.

Results of the use of electronic computors and modernized procedures in three phases of the diesel industry—spare parts handling turbocharger design and lube oil testing—prove that great benefits are being obtained and that these are equally applicable to other phases of the industry.

. . . communications, computors, automation for efficient parts handling

WHEN a piece of equipment is down—you need parts right now. So you go where you get them quickest. Generally it's the dealer where you bought the equipment. If he doesn't have them, you look elsewhere.

Smart manufacturers see to it that their dealers are well stocked—or that they can be supplied fast. But there's a long chain of events between the dealer's shelf and the manufacturer's warehouse—and a dealer can't stock everything. Let's see how one manufacturer, Clark Equipment Co., deals with the situation.

Their Central Parts Division Warehouse, through electronic and integrated processing equipment plus modern procedures, accomplishes two things. They keep the dealer well stocked with fair-wear-and-tear parts (replenishment orders) and can get out emergency orders of special parts in less than two hours after the dealer is contacted. Here's how the warehouse operates.

The warehouse is linked by a 13,000-mile network of private communications wires to nine Clark plants and sales offices and 95 dealers.

These orders are processed and filled at Central Parts with speed and accuracy. This is made possible by skilled personnel using the latest automated and electronic equipment. Parts shipment is further expedited through use of tractor trailers, fork-lift trucks powered hand trucks, a 468-ft conveyor belt, a punched-tape system and an IBM electronic calculator and accounting machines.

An IBM system tabulates, records and remembers every vital fact about parts ordered. Based on normal usage experience, electronic equipment compiles a list of "fair-wear-and-tear" parts. These are automatically shipped to the dealer with a new unit.

This anticipation of normal need plus economy resulting from initial bulk shipment saves both Central Parts' and dealers' time and money that would be wasted by piecemeal ordering of replacement parts. It also makes parts more readily available to customers. In addition, the system's records provide a basis on which Clark can suggest proper quantities of spares the dealer should stock.

Replenishment orders are on their way within three days or less. Emergency orders which involve critical operating situations go out the day they are received.

Every dealer has a regular shipping day. Replenishment orders are sent to him every seventh day. About 75% of the orders go through this way.

Speed and accuracy keynotes handling of emergency orders. Here's an example of how a rush order is filled. Let's assume a contractor's dozer is damaged in a collision. To repair it, parts are needed which are seldom if ever replaced.

To get these parts, the construction superintendent normally calls the dealer from whom he bought the machine. A quick check by the dealer reveals the damaged parts aren't listed among the fair-wear-and-tear parts and aren't in stock.

He immediately puts an emergency order through the private wire to Central Parts. There a parts editor quickly edits and verifies the emergency request.

Verification means the parts number must correspond to the parts description. If there is any doubt, a call is made to the dealer.

With the order verified, the IBM room takes over. The order is run through a file to determine where parts are located and to select the number needed. The order is then typed. "Picking tickets" are issued and automatically sorted so that the parts picker never has to retrace his steps or backtrack.

An expeditor then carries the order to the shop, the parts are collected, packed and delivered to the best choice of common carrier.

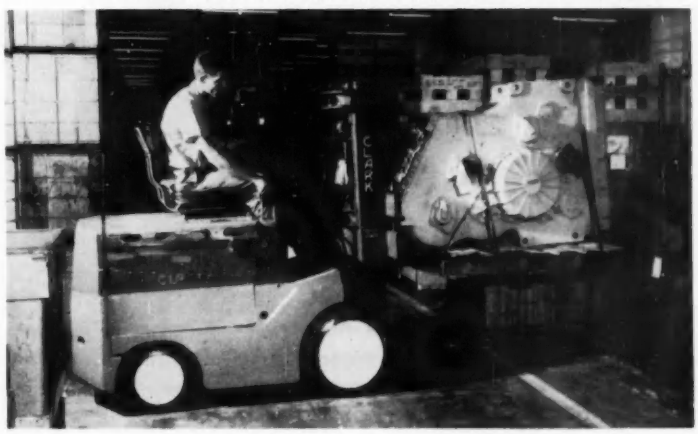
Less than two hours after the emergency order is received, replacement parts for the damaged machine are on their way via air express, bus, truck, or rail—whichever is the fastest way available.

Replenishment orders are handled about the same way except there is no great need for speed. However, all orders received prior to 5 p.m. are processed by the tabulating department that night so they can be shipped the next day.

These orders, too, usually arrive over the network. They are logged and verified, then checked by the parts editor. From here on, the order is followed up like an emergency order except that it is not moved up to the head of the list of shipments.

(*Continued on page* 19)

Heavy parts are moved by efficient fork-lift to waiting carriers. This warehouse covers seven and a-half acres, stocks over four million items.



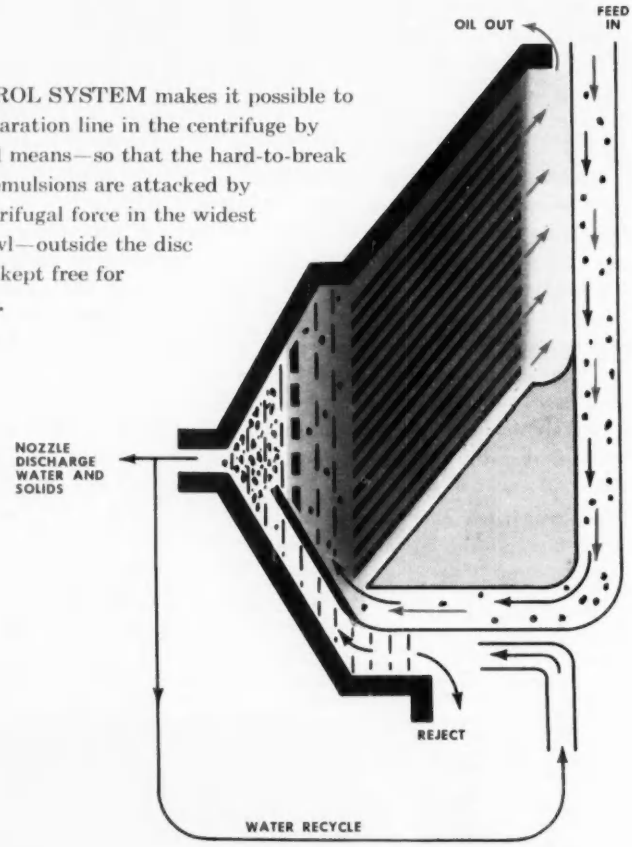
NO OILY SLUDGE DISCHARGE . . .

When you Purify Heavy Industrial Oils by the Sharples GRAVITROL* SYSTEM

you handle only:

- **CLARIFIED OIL**
- **OIL FREE SOLIDS** which settle out in the water phase and are consequently "washed free of oil". These solids are easily disposable.

The GRAVITROL SYSTEM makes it possible to control the separation line in the centrifuge by simple external means—so that the hard-to-break oil and water emulsions are attacked by maximum centrifugal force in the widest part of the bowl—outside the disc stack which is kept free for oil purification.



The GRAVITROL SYSTEM *eliminates* "hard-to-dispose-of" oily sludges and oil losses to the solids, as well. Installations handling tank bottoms, residual fuel oils, steel mill lubricating oils and the like, show high reclamation rates in continuous "labor-free", around-the-clock operation, high purity of the oil and easily disposable solids discharge—all of which add up to a quick "pay-out".

*Patents Applied For

Find out about the GRAVITROL System—write Sharples today for the eye-opening facts.

Another Sharples Exclusive

THE SHARPLES CORPORATION

2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA

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Associated Companies and Representatives throughout the World

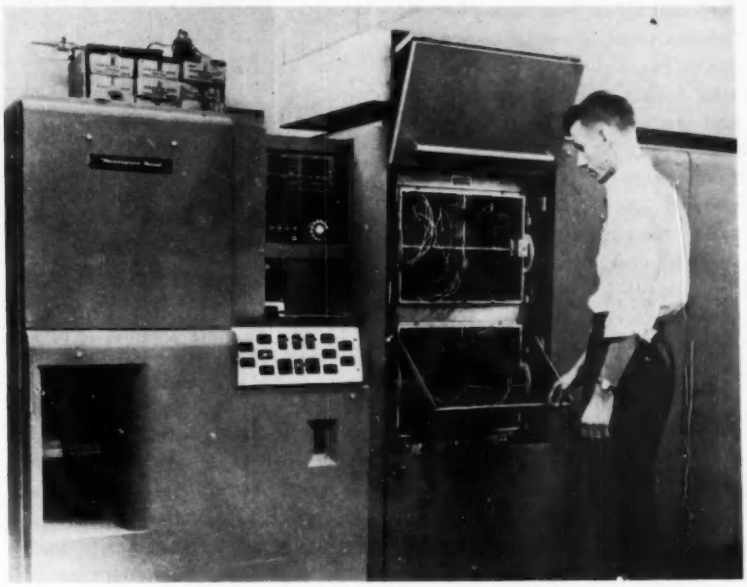
. . . computors solve design calculations, rapidly and accurately

DOING the mathematics to solve complex engineering problems takes hours—even days. The job is tedious, expensive, and there's always the possibility of human errors.

Take, for example, a typical equation encountered at the Schwitzer Corp.

$$I_1B_1w^2 + I_2B_2w^2 + I_3B_3w^2 + I_4B_4w^2 + I_5B_5w^2 + I_6B_6w^2 + I_7B_7w^2 = O$$

For years, the solving of this and other even more complex equations kept Schwitzer engineers from exerting their efforts in creative work. Now, use of the Remington Rand Univac 60 electronic computor solves these equation in a fraction of the time needed to do it manually—and without human errors.



Univac 60 electronic computor saves engineers countless hours in solving complicated design problems—and without possibility of human error. Time saved cuts manufacturer's costs, means better, lower-cost product.

Turbochargers and superchargers, two of Schwitzer's products, require highly-specialized manufacturing techniques and extremely-critical testing methods. Both are run through their paces in test-cells. The varying conditions under which each assembly must operate are carefully duplicated. Analyzing the test results requires complex and tedious calculations.

Data from the test runs are entered on printed forms. Generally, there are from six to nine test data sheets on each speed at which the unit is tested. With a desk calculator, about 45 minutes is required to compute each of these test sheets or a total of four to six hours for the group.

Tests are run at five different speeds and require from 15 to 20 man hours to compute via the manual method.

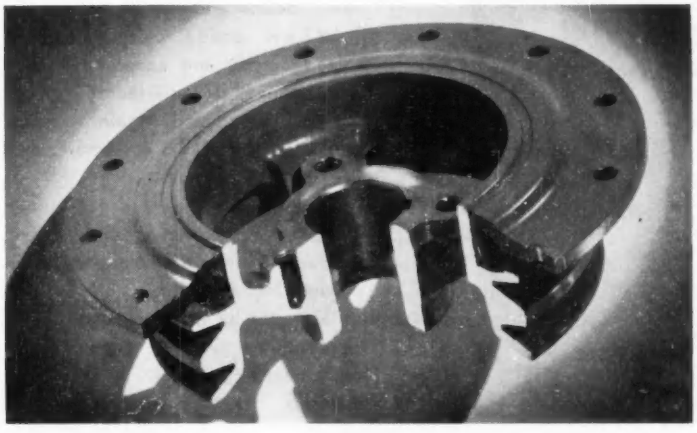
Through the Univac, card programming was used to break down the functions of the equation into simple arithmetic steps. In this manner, sub-routines were used including logarithm and exponential equations.

Another Schwitzer product, the torsional vibration crankshaft damper, also requires numerous complicated calculations to complete its proper designs. An analysis is made prior to the design of the damper for each new engine installation.

The number and complexity of the calculations involved in designing the torsional vibration dampers make human errors frequent. This complicates a process which in essence is the successive elimination of errors in estimates.

The Univac reduces human errors in calculations. By using the card programming program to successively estimated values, the correct frequency values can be found quickly and efficiently. This saves much valuable engineering time.

Proper design of this vibration damper requires numerous complex calculations. Correct design data is found quickly and efficiently through electronic computation.



. . . well-designed facilities, electronic data logging speed testing

EVALUATION of new lube oil performance and additive effectiveness requires engine testing. This evaluation includes engine teardown after testing to check for parts wear and amount and type of deposits (principally on the piston).

Where many additives must be checked and screened to find the most effective—quick testing and evaluation is desirable. Generally this takes 10 to 20 days per formulation. However, use of an automatic data-logger plus unique arrangement of test facilities by one company, Enjay Laboratories, has cut this to four days.

Enjay Laboratories provides the technical sales service for the Enjay Co., N.Y.C., one of the largest marketers of lube oil additives.

Some of the novel features of this lab are: an 88-point automatic "data-logger"; unitized over and under construction of engine test stands; quick-disconnect features throughout for all services and instruments; no bolt-down engine test stands; and complete control of all phases of test work.

The automatic data logger records 11 items from each of eight engine test cells in the lab. Such variables as engine temperature, speed, pressure and load are automatically recorded by this unit.

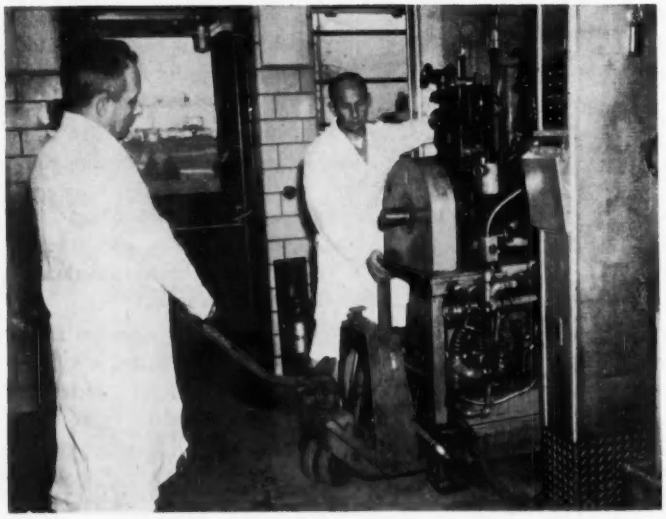
As much as 6-16 days time is cut in evaluation of lube oil performance and additive effectiveness by an 88-point automatic data-logger. This means more efficient recording in far less time, frees personnel for other work.

The unit collects these and other accurate and legible data without human errors. It systematically prints valid data on testing variables, replacing the usual handwritten log sheets. Test variables are then presented in the most suitable form for operational control. Thus, the unit improves recording efficiency and frees personnel for more important work.

Included in the lab are eight 6-hp, 1-cyl, diesels, each mounted over a dynamometer on a compact test stand. Total weight of each unit is approximately 2000 lb. Four vibration-absorbing Enjay Butyl rubber pads support each test stand. These pads plus the weight of the unit hold the stand stationary, eliminating the need for conventional hold-down bolts.

Tests are run five days a week, 24 hours a day by technicians working three shifts of two men each. After each test run, engines are disassembled, all necessary readings taken and recorded, and the engine rebuilt by technicians in a shop adjoining the lab.

Hold-down bolts are eliminated by use of rubber vibration-absorbing pads, this, plus units weight hold engine test stand stationary. Many time-saving quick-disconnect features in Enjay Lab mean savings for maker and user.



Conclusion

Results show the benefits obtained by use of electronic equipment, modern systems and methods. Companies using these latest techniques and users of their products share in these benefits. Three different applications have been discussed to make this point.

In parts handling, common spares are found on the dealer's shelf. Others can be obtained quickly from the factory. All benefit—manufacturer, dealer and equipment owner.

When design calculations are solved quickly and accurately, engineering time, always a factor in product cost, is reduced. Again both the manufacturer and his customer benefit.

Similarly, facilities and techniques to speed up screening and testing produce lower initial cost plus faster product improvement.

These results are typical and can be obtained by use of electronic equipment, modern technology and methods.

Detroit Diesel servicemen to win important recognition for thorough product knowledge in new incentive training program

GM FORMS SERVICE CRAFTSMAN GUILD

GENERAL Motor's Detroit Diesel Engine Division has announced an exciting new training program for service personnel important to our whole industry. Key to this upgrading project is this quote from GM's announcement:

"The basic concept of good merchandising still revolves around one fundamental—the individual needs of the customer."

GM has recognized that one of the most important customer needs is standard high quality service. And the man in the front lines is the service technician. Here are the objectives of the GM Diesel Craftsman Guild program:

1. To upgrade the prestige and product knowledge of the serviceman to technician level.

2. To increase sales and service by substantially improving overall efficiency of service workmanship.

3. To satisfy those all important customer needs by assuring standard high quality service.

Servicemen Gain . . .

The guild is both a challenge and a promise to the participating servicemen. It offers recognition for effort from both employer and Detroit Diesel. A stimulating incentive for self-improvement, it is a source of pride in keeping up-to-date on changes in the product and in being a member of a smoothly working service team. With this will come customer recognition of quality workmanship symbolized by the identifying Guild membership shoulder patch.

Distributor/Dealer Gains . . .

There are important benefits in such a program for GM's far flung distributor/dealer organization. Improved service means better customer relations which in turn means more sales. As the prestige of service personnel rises there will be less turn over, more job security, fewer customer complaints. To gain distributor/dealer backing for their diesel Guild GM has worked out a well integrated program of local and national publicity.

How It Works . . .

Membership in the GM Service Craftsman Guild is open to service personnel employed by Detroit Diesel distributor or dealer, actively servicing the product.

After application for membership has been made through the employer, there is a qualifying examination monitered by a factory representative. Sustaining quizzes, given every two months, are based on GM technical publications. All exams are graded at Detroit Diesel headquarters and a permanent record of achievement is maintained. Regional Service Engineers will make annual awards to qualified members.

General Motors has long experience in such training programs through their automotive division organization. Many members of these comparable Guilds have belonged for over twenty years. The Oldsmobile Guild has some 25,000 members and Chevrolet 32,000.

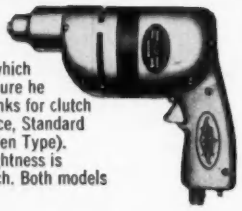
Now, Detroit Diesel has its own Guild. This development in our industry is important, not only because it gives diesel craftsmen the recognition they have earned, but will help to improve the general level of servicing standards, directly benefitting the user.

CERTIFIED SIOUX POWER

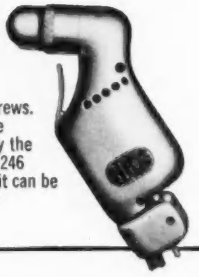
Electric Drills

SIOUX ELECTRIC SCREWDRIVERS

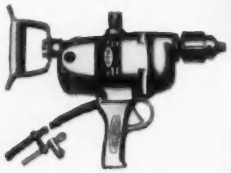
NO. 260 — 262
On No. 260 Super Screwdriver the operator controls the tightness with which a screw is set by the amount of pressure he applies. The ¼" Hex Drive takes shanks for clutch head screwdriver bits, Reed and Prince, Standard screws, Phillips, and socket head (Allen Type). On the No. 262 Super Screwdriver tightness is pre-determined by adjusting the clutch. Both models equipped with reversing switch.



NO. 242
It fits the hand, and operates in restricted space like no other electric screwdriver. It quickly drives or removes all types of screws. No. 242 has a positive clutch; the operator controls the tightness by the amount of pressure applied. No. 246 has an adjustable clutch, so that it can be preset for any uniform degree of tightness desired.



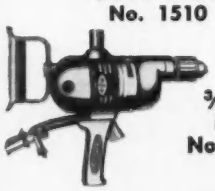
1" H.D. DRILL
No. 1579



⅝" & ¾"
H.D. DRILLS
No. 1560, 1575

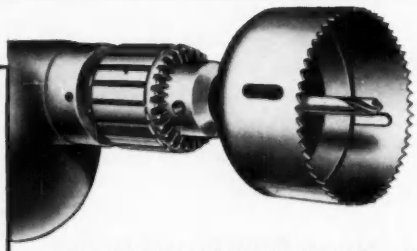
½" H.D. DRILL
No. 1550

½" STD.
DUTY DRILL
No. 1510



⅜" & 5/16"
H.D. DRILL
No. 1517, 1519

½" SLOW SPEED
DRILL No. 1548



SIOUX HIGH-SPEED STEEL TEETH HOLE SAWS

will cut holes from ⅝" to 6" in diameter, in any free machining material to a depth of 1⅛". Alloy or stainless steel may be cut at slow speed. High-Speed teeth welded to chrome-vanadium body give maximum life and cutting ability.

POWER* SPECIFICATIONS SIOUX ELECTRIC DRILLS

When it's a SIOUX you know what it will do

Catalog Number	No Load Speed	H.P. and at Load Speed	R.P.M.	Oz. Ft. Torque at Load Speed	H.P. and at Peak Load Speed	R.P.M.	Oz. Ft. Torque Peak Load
1475	2250	5/64	1525	4.9	7/64	1050	8.8
1480	1600	7/64	1140	7.9	5/32	790	16.8
1485	1650	3/32	1060	6.9	1/8	620	16.7
1495	1650	3/32	1060	6.9	1/8	620	16.7
1498	400	3/16	275	45.0	9/32	215	108.0
1510	525	27/64	370	95.0	39/64	230	222.0
1517	925	13/32	670	49.0	9/16	540	135.0
1519	1250	13/32	860	37.5	9/16	500	96.0
1525	1650	5/16	1060	31.0	3/8	680	45.0
1541	925	13/32	670	49.0	9/16	540	85.0
1548	525	27/64	370	95.0	39/64	230	222.0
1550	525	7/16	325	108.0	17/32	175	252.0
1560	400	9/16	260	175.0	3/4	155	400.0
1575	400	3/4	205	308.0	1-1/8	125	748.0
1579	350	49/64	200	315.0	1-9/64	115	800.0
1472	1600	13/64	960	17.8	17/64	720	32.4
1473	950	13/64	575	31.6	17/64	430	55.0
1474	625	13/64	375	44.6	17/64	280	84.2
1477	950	13/64	575	31.6	17/64	430	55.0
1478	625	13/64	375	44.6	17/64	280	84.2
1479	1600	13/64	960	17.8	17/64	720	32.4

*for complete specifications

SEE THE NEW SIOUX CATALOG

when it's a SIOUX

You know what it will do!

The Horsepower and torque for each SIOUX drill is rated, stated, and certified. It isn't necessary to buy just a drill. When it's a SIOUX you know what it will do. See the power specifications for SIOUX Electric Drills in this advertisement.

NEW *Super Powered* **¼" and ⅜" DRILLS!**

Here is super power to provide all the torque necessary for any operation where this type of drill would normally be used. (See specifications) And there's a speed for every need. It's an entirely new design in which the brushes have been located at the fan position at front of the drill. The advantages include cooler running, and easier inspection and replacement of motor brushes without partial or complete disassembly of the tool. Ball and roller bearing construction, with finest precision gears and mechanical design have achieved a new high in output efficiency.

¼" No. 1472, 1473,1474

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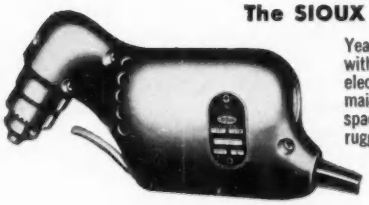
All time sales champ

The SIOUX No. 1495 ¼" ALL ANGLE DRILL



Year after year this is a top seller in the SIOUX line. It's popular with almost everyone—auto mechanic, sheet metal worker, electrician, shipbuilder, woodworker, assembly line, factory maintenance man. It fits the hand and operates in restricted space like no other tool. It's a most convenient handful of rugged power.

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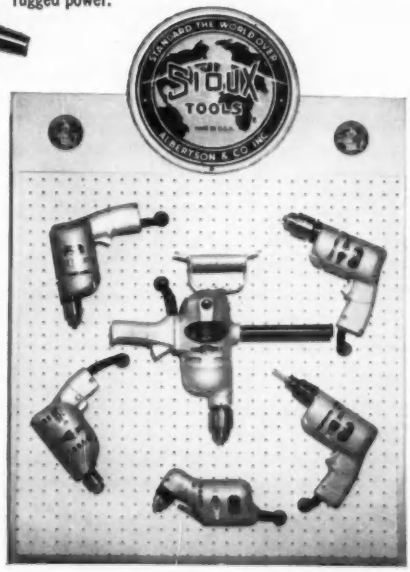
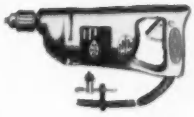


⅜" H.D. DRILL No. 1541

¼" H.D. DRILL No. 1525 BALL BEARING



¼" H.D. DRILL No. 1480 SEMI BALL BEARING

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YOUR MAINTENANCE PROGRAM — GOOD OR BAD?

Plants neglecting maintenance should at least expect and prepare for accidents.

Survey of engine failures and accidents pins over half on inadequate maintenance programs. Here are the findings and listed requirements for a good program. See how yours scores.

Adapted from "Adequate Maintenance Programs", published in "The Locomotive" of The Hartford Steam Boiler and Insurance Company, written by Earl L. Kimmler, Assistant Chief Engineer of that company's Machinery Division.

HOW'S your maintenance program? Good? Well, that's what 117 others probably said but here are the facts. Of 233 engine failures analyzed, 117 or 50.2% were the result of inadequate maintenance! Now, let's ask again, how's your maintenance program? Want to think it over and maybe do a little checking?

First see that your program has all the required fundamentals. Through its inspectors this company has gained considerable experience with different maintenance programs. This experience has shown five basic requirements for a workable and successful program.

People—Caliber of the people charged with maintenance is the most important single factor. It starts with the supervisor of maintenance. Get a good man and don't tie his hands. He should work directly under management and his decisions, for example, to take a piece of sub-standard equipment out of service, should be subject to their veto alone.

Operators and maintenance personnel should be well qualified in both practical and theoretical aspects of maintenance. Training programs will insure this. They should stress recognition of trouble symptoms and action to be taken in emergencies. Also, don't fail to take advantage of the schools maintained by engine and equipment builders.

Records—Unless pertinent details of performance, inspection, maintenance and repair are made a matter of record, you won't have a maintenance program worth its salt. Records should be complete but as simple as possible. Then, if they're to be of any use they must be conscientiously kept.

Records show many things. They are the documentation of "experience". Carefully analyzed, they show signs of inefficient operation and impending troubles. They are a basis for establishment of proper inspection servicing periods. Study of them will often reveal the true causes of trouble. Finally, performance records are the only way to determine costs.

Inspection and Maintenance—A well-planned and properly-supervised inspection and maintenance procedure insures that whatever is necessary is done and at the proper time. Manufacturer's recommendations, modified by experience (records, again), are the backbone of the program. Proper planning will spread the work load more evenly and avoid "hurry-up" jobs.

Communication—Information exchange betwen departments boosts the chances of success of a maintenance program. Results—less equipment failures and downtime.

Problems and future plans should be discussed frequently at regular joint meetings of management and all heads of departments. Thus, the head of maintenance will be kept aware of the overall picture and be in a better position to anticipate the effects of operational changes and

set up maintenance schedules accordingly. Also, all will become aware of the maintenance supervisor's problems and needs, particularly regarding new equipment or tooling.

Communication should extend downward too. The men doing the work should be advised of what is to be done and given technical information on how to do it.

Equipment Standardization—When selecting new or replacing old equipment, standardization should be kept in mind. This practice, when possible, simplifies maintenance and cuts spare parts inventory costs. When selecting this new equipment,

The person in charge of maintenance should be at the same level of authority as the person in charge of production.

accurate and up-to-date maintenance records are invaluable since they tell which equipment has performed best and is most reliable.

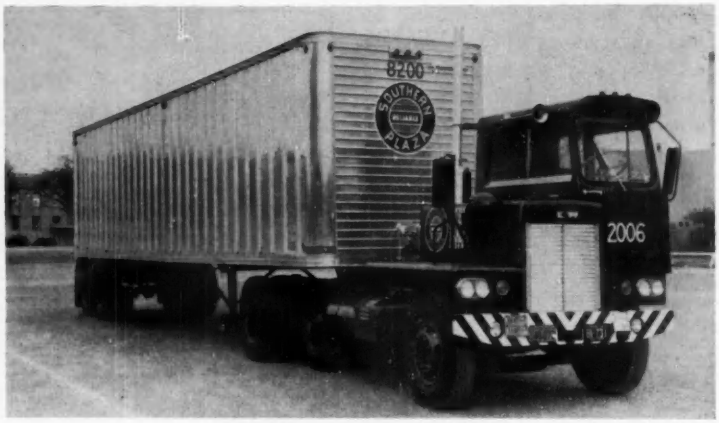
Conclusion

Adequate maintenance prevents equipment failure and accidents. This survey shows that 50.2% of failures can be traced to poor maintenance. Set up of a proper preventive maintenance program is management's responsibility. Supervision is also their job. And conversely, failures due to an inadequate maintenance program or lack of supervision can also be laid right on their door step.

TROUBLE	NO.	COMMENTS
Progressive Cracking Or Fatigue Failures	37	This is an end-result, not a cause. Sufficient evidence was found to show inadequate maintenance as a general cause and examination of broken parts determined the nature of failure. Complete analysis was blocked in these cases by repair work done to restore service. Where specific causes were found they are listed under other categories of failures.
Dirty or Inadequate Lubrication	25	Principal causes: Sludged oil, plugged oil system, low oil, dirt in oil, excessive lubricant. Appraisal led to one conclusion: sheer neglect or misunderstanding on the part of persons charged with lubrication maintenance.
Excessive Wear Of Parts	19	Principal causes: Worn bearings, bushings, seals, piston rings, valves, etc. Conclusions reached were that inspection was ineffective; that inspection was not conducted at recommended frequency; or if manufacturer's recommendation was followed, severity of service requires more frequent inspection.
Misalignment	9	Principal causes: Improper original alignment between driving and driven equipment and failure to check at experience-determined intervals to assure perfect alignment. Modern machinery with high pressures and high speeds make good alignment more critical than ever before.
Improper Adjustment Or Fit Of Parts	10	Principal causes: Improperly adjusted valves, linkages, etc.; improper torquing during assembly—over and under tightening, uneven tightening; incorrectly installed gaskets and seals; incorrect clearances. Use of recommended procedures and data during assembly and at properly spaced service intervals will correct these conditions.
Excessive Carbon Deposit	8	Principal causes: Faulty injection equipment; poor compression; excessive lube oil. The first step is elimination of the causes of deposit buildup. Inspection periods should be at short enough intervals to detect this condition and correct it before deposits become dangerously heavy.
Scale In Water Jackets	6	Causes: Use of unsuitable water with inadequate treatment. Use of a closed system with clean, soft, inhibited water—its pH should be neutral or very slightly alkaline — is the best solution. If the system must be open, all water should be treated to remove scale-forming impurities. Scale formation interferes with heat transfer and its presence can often be picked up by increasing temperature differentials as indicated in the engine log sheets. Immediate action should be taken to clean the jackets as overheating of the engine parts can be disastrous.
Improper Layup During Idle Periods	3	Causes: In all these cases, cracks caused by freezing were responsible. Seven additional cases involved water-cooled compressors. These are obvious cases of negligence and lack of supervision. While here the failure was obvious, had not freezing occurred, other troubles would have developed. Every engine builder has recommendations for proper processing before engine layup. Adherance to these would have not only prevented freezing but would have eliminated chance of rusting and corrosion.

EXPRESS GOES DIESEL

Economical, rugged, reliable and lightweight—the decision went to Kenworth Cummins Model T-522.



Powered by Cummins NT-180 these new Kenworth Model T-522 take over Southern Plaza Express "Fast-On-Land-Service".

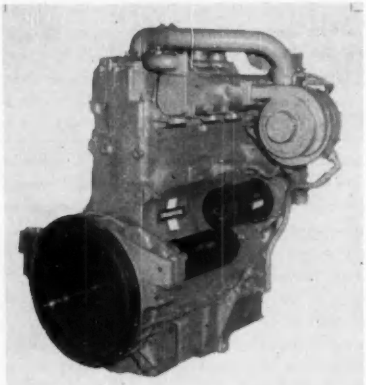
ANOTHER truck fleet has gone all diesel. Southern-Plaza Express, Inc., has "seen the light" and converted their entire fleet of gasoline line haul equipment to diesel power. The last of 74 new Kenworth Cummins diesel-powered Model T-522 trucks were delivered in January of this year. These trucks are being operated with an entirely new "Trailmobile" fleet of 40-ft semi-trailers.

Economy of operation, ruggedness, reliability and lightweight were the primary considerations in deciding on the diesel units. The basic cab-beside-engine design, through its simplicity, is a major weight-saver. The new Cummins NT 180 engine, extensive use of aluminum, fiber glass nose section and fender, and the Kenworth FTO-28 pusher-type bogey all contribute to keeping the weight of the 3-axle tractor chassis low.

The Cummins NT-180 is a compact lightweight Turbodiesel rated 180 hp. Turbocharging is said to give this 4-cyl unit power equivalent to 6-cyl engines of the same bore and stroke. Its overall length is 45-in. and it weighs about 450 lb less than equivalent power 6-cyl engines of similar bore and stroke.

Tests showed that the NT-180 would give many more miles per gallon of fuel than the gasoline engines replaced.

For fuel economy at increased speeds, each of the new trucks is equipped with a positive air-operated Cruiser-Master governor. Since engine components are generally the same as the time-proven Cummins "NH" diesels, maximum miles between overhauls are anticipated.



Powerful NT-180 proved in tests to give more miles per gallon of fuel than gasoline engine it replaced. Compact, lightweight this Turbodiesel is ideal cab-beside-engine installation.

Other major components include the new Spicer 12-speed Syncromaster transmission in an aluminum case, a Spicer 2-plate clutch, and Kysor aluminum shutters on the tube-and-fin type radiators.

The FTO-28 suspension places the trailing axle in front of the drive axle. This results in a short wheelbase of 150-in. for the 3-axle trucks. The overslung 4-spring construction distributes loading over the frame at six points with a 66% - 34% distribution. As there is almost no weight transfer between axles, "bogey hopping" is eliminated, light or loaded. A considerable weight saving is achieved and riding qualities are excellent.

The one-man wide cab is designed for unlimited visibility. It has narrow corner posts, deep windows, and the driver sits in a high off-center position. Ventilation and fresh air heating keep the driver cool in summer, warm in winter. The insulated, rubber-mounted cab is entirely separate from the engine. All engine heat is vented to the rear and right side, completely away from the cab.

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Portable hydraulic track press cuts downtime in turning pins and bushings. Service in the field, becoming widely accepted throughout the construction industry, can mean real economy.

LET'S TALK TRACK

How long should tracks last? This depends on the tractor itself, the job, soil conditions, maintenance and the operator. Heed the advice given here and you'll not only cut track costs but save the rest of the tractor and do more work.

by Thomas C. Kingsley, Service Dept.
Caterpillar Tractor Co.

IT'S just good business to take care of track parts and rebuild them at the most economical time. Modern truck groups are the result of continuous research, design and improvement over a long span of years. Look over the jobs today's crawler tractors are doing—ripping rock, dozing out huge stumps and push-loading giant scrapers. Only track that is as modern as today's job can stand up to these conditions. But no matter how well it's built, proper care is essential to gain the best performance.

What Shoes For The Job

For more economical service life under severe operating conditions, the manufacturer makes available a selection of attachments and special parts that will satisfy all but the most extraordinary conditions. Application determines which attachments are most economical and most needed.

For example, track shoes, rollers, idlers, links, pins, bushings, final drive sprockets, guards and even hardware wear longer in dirt operations than in rock. Tractors operating in rock must be equipped for it to get the longest possible service life.

Let's consider track shoes first. Wide track shoes are the most satisfactory when flotation is needed for mud, gumbo and some dirt work. Quite naturally, track shoes are more susceptible to breakage where rock is encountered. Wide track shoes have greater overhang beyond the track chain than narrow shoes and loads applied to the outer edge create greater leverage. Results—wide shoes are more frequently damaged while working in rock than are narrow shoes. Also, when working in hard material narrow grousers will penetrate deeper, increasing traction.

When a tractor is called upon to work almost exclusively in rock, special heavy-duty shoes should be used. These may be of either double grouser or flat design depending upon the traction needed. In especially abrasive rock a manganese alloy shoe may prove to be the most economical investment.

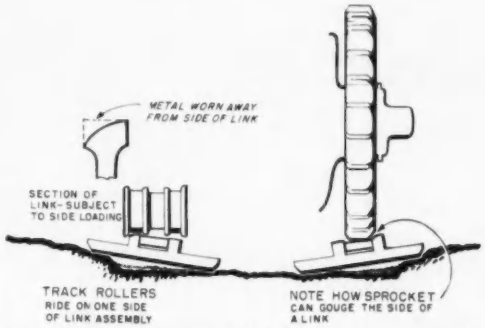
When working in rock, don't overlook the advantages of track roller guards. They'll pay. These guards keep rocks from entering and being crushed between track rollers and track and thus effectively protect track parts and extend service life.

Plus abrasive wear, the crushing impact causes breakage of links, roller flanges and other parts and external wear on bushings idler rims and sprocket teeth. Impact of the crushing action slashes life of track roller bushings. Rock can cause track to tighten excessively. Stretching causes the link pin and bushing bores to expand, resulting in loose pins and bushings.

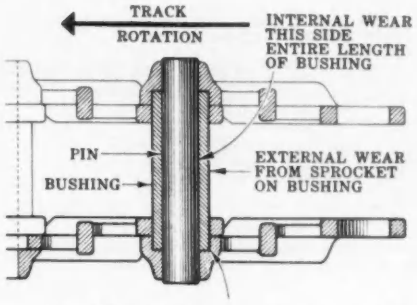
Track roller guards also help hold tracks on the rollers on steep slopes. They also help reduce wear on roller flanges and idler pilot rims. They're not unimportant gadgets; they are essential for economical operation in rock and over rough terrain.

Rock isn't the only bad actor. Snow, mud and wet sand tend to "pack" in the track and cause severe strain on all track components. To prevent material buildup and track clogging, install special snow shoes with a cut-out section in the center between bolt holes and snow sprockets with deeper recesses between teeth than standard sprockets.

The advent of large push tractors has also brought need for other special track shoes. Width of the push


METAL WORN AWAY FROM SIDE OF LINK
SECTION OF LINK-SUBJECT TO SIDE LOADING
TRACK ROLLERS RIDE ON ONE SIDE OF LINK ASSEMBLY
NOTE HOW SPROCKET CAN GOUGE THE SIDE OF A LINK

Avoid damage to track and final drives by using narrow or inside offset shoes that match cut of narrowest scraper on the job.



LINK COUNTERBORE CAUSES EXTERNAL BUSHING WEAR

tractor is usually wider than older makes of scrapers. The outer edge of the track shoe rides up out of the scraper cut forcing the track in toward the tractor. This causes sprockets to rub against the outside link as well as accelerating wear on roller and idler flanges. Where flotation is not a factor, narrow shoes offer a solution. If flotation is required, as in sand or mud, offset shoes should be used that match the cut of the narrowest scraper on the job.

Operators, Not Cowboys

Track rollers distribute the tractor's weight over a large area. Proper operating techniques let each roller carry its share of the load. Reckless, "cowboy" operation over rough, rocky ground or other obstacles slams the impact from one track roller to another. This is one of the quickest ways to shorten track life.

Another damaging practice is "spinning" track. It provides no more drawbar pull than a spinning rubber tire provides rim pull. But it is "burning off dollars of iron." A little load adjustment or different approach can save that "burned off" track life.

When operating in mud, clay or gumbo, material sometimes packs around the rollers and usually builds up on top of the guards and around track carrier rollers. In freezing temperatures, packing causes even more trouble. Packing tends to "freeze" rollers and stop free rotation. Once rotation is stopped, friction starts and flats are worn on the roller. It takes engine horsepower to get this rapid wear, so profit is actually lost in two ways.

It's easy to correct this problem. Drive the tractor to dry ground. Run forward and backward to work off excess mud. If water is handy, a washdown will help. If no such facilities are available, a little time spent (periodically) in "spare work" to remove the mud will be a good investment.

Sometimes a tractor will freeze to the ground overnight. To prevent track damage when breaking it loose, clean off as much mud as possible. Better yet, park the tractor on planks, logs or even brush to keep the tracks up out of the mud.

Keep an eye on track adjustment when operating in mud and sand. These materials pack and tighten track, robbing engine horsepower, and subjecting track parts and final drives to great stresses. Loosening of the track adjustment during muddy operation may be necessary.

Operating in snow presents much the same dangers as operating in mud. Keep the track group as clean as possible and the rollers free to rotate.

Maintain the Track

Prevent trouble before it starts. Maintenance should be organized so that every man from the operator to the maintenance supervisor knows his exact responsibilities.

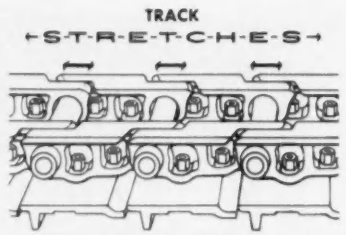
The first item in group maintenance is adjustment. Inspect daily. Loose tracks sag between points of support. This causes additional movement and wear between contact surfaces of pins and bushings. When a tractor with loose track adjustment is driven at high speeds, the track can be thrown off.

Tracks adjusted with a wrench are rarely overtightened. But with tractors equipped with hydraulic track adjusters the opposite is true. A few shots from a lever-type grease gun puts the track in tension. A few extra shots and the track can be overtightened. This can cause overheating of pins and bushings. Frictional heat can temper the heat-treated metal and reduce its hardness, increasing wear and cutting service life.

Many tractors are equipped with idlers that may be placed in a high or a low position. For most applications, idlers should be in high position. However, when a tractor has heavy front mounted equipment, change idlers to the low position.

With a bulldozer, for example, better balance is attained with the idlers in low position. Track shoes under the idlers are then in the same plane as the shoes under the rollers. However, they are subjected to greater wear as there is a scrubbing action on each grouser as it passes under the idler.

Another major part of any maintenance program is lubrication. There is always risk in establishing any lubrication interval. If intervals are too frequent, there is always danger of overlubrication causing blown seals and damaged rollers. If intervals are too far apart, there is the tendency to forget about those parts. Middle-of-the-road practices are best.



. . . when pins and bushings wear. Check tension daily and adjust to proper tightness.

There is only one general rule for track roller lubrication—*follow the manufacturer's recommendations.* Specified intervals are for average conditions. Sometimes the interval must be reduced when operating in deep mud or water. The manufacturer also specifies the type of lubricant that will provide best service in its product. These recommendations are backed up by years of research and field testing and should be followed.

However, these instructions can't eliminate possibility of introducing trouble. Contaminated lubricants, uncleaned fittings, overlubrication or underlubrication are major causes of shortened service life.

When a hand-operated grease gun is used, apply only the amount needed to feel a slight additional resistance on the gun handle. More pumping will create enough hydraulic pressure to damage the seals. If pressure can't be built up it usually indicates a damaged seal. Replace immediately.

On power-operated lubricant dispensers, a relief valve should be installed in the lubricant line to prevent seal damage. Be sure it has the proper initial pressure setting and periodically recheck the setting.

Under no circumstances should pins and bushings be lubricated.

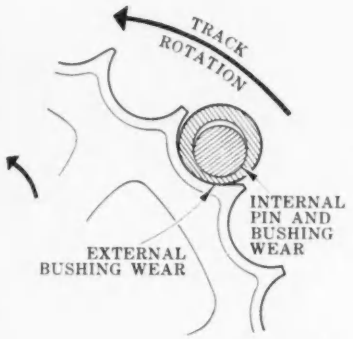
Daily inspection should include a critical look at track hardware. Bolts and nuts on the track group should be checked regularly. Loosened nuts and bolts should be retightened immediately to prevent shearing, loss or damage to the part which they secure. Guards should be repaired when first found damaged, since a damaged guard usually offers little protection.

Inspection will reveal major problems too. For example, a misaligned idler may be found. This will cause wear on the idler's pilot rim section, wear on sides of track links and on roller flanges. Adjust idler alignment with shims located beside the idler bearings.

A bent track roller frame member will cause track misalignment. If the idler cannot be adjusted to proper alignment, frame members should be straightened or replaced before they cause serious damage to the other track parts.

Turning of pins and bushings can help reduce replacement costs. As pins and bushings wear, the track becomes longer and adjustment is necessary. When the limit of track adjustment is reached, pins and bushings should be rotated 180 degrees. This will nearly double their service life.

The master pin and bushing should not be used as a wear guide since wear at this point is more rapid. Adjacent pins and bushings, each side of the master pin for one-half the sprocket circumference, usually show more wear than the remaining pins and bushings. Experience has shown that periodic replacement of the master pin reduces wear on adjacent pins and bushings.

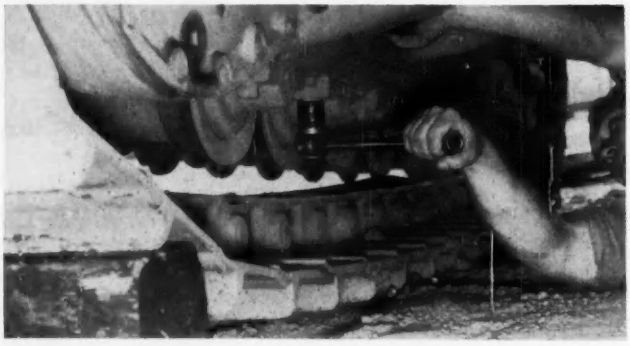


Never operate with broken bushings as this accelerates wear of all other track parts. Also, track with badly worn pins and bushings causes jumping of the track and rapid wear on sprocket teeth.

All track rollers do not wear at the same rate. It is a profitable practice to switch rollers as tires are switched on automobiles. This distributes wear and extends service life of the roller group as a whole. Change the position of rollers about midway in their normal expected service life. Sprockets and idlers can also be switched to equalize wear at the midpoint of their service life.

To determine wear between links and rollers, check clearance between the roller flange and link pin boss. Dealers should be consulted for maximum wear limits so that rollers and links can be economically rebuilt.

Rough work may cause loosened collar bolts—check and tighten both inside and outside end bolts, and it will be easier to get at by driving tractor up on blocks.

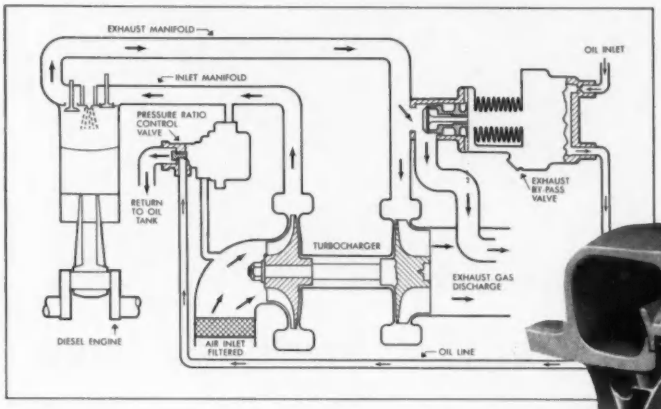


Recondition For Savings

Reconditioning of track and its related parts is a sound investment if shoes, rails, idlers, rollers and sprockets are rebuilt before they have gone too far.

In recent years, dealers have developed many ways to cut costs and downtime. For example, a Kansas machinery dealer, under a so-called

Most significant advances in turbocharging



Pressure ratio control valve

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"loaner" plan, loans track groups to a tractor owner while his track group is being rebuilt. According to the dealer, savings of up to 60% are possible when track is reconditioned rather than replaced. Downtime is cut from days to minutes.

A Minnesota equipment dealer offers firm quotes on buildup work. Roller, idler and track reconditioning is based on wear. Rollers, for example, are examined to find the amount of wear and then exchanged for rebuilt ones. This way the customer only pays for reconditioning of his rollers and cuts his downtime.

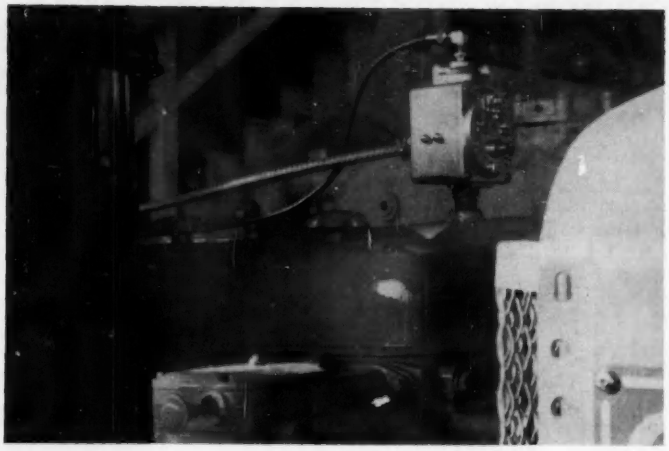
Sometimes parts cannot be economically rebuilt. Track rollers that show excessive wear or have enlarged or bellmouthed bores, distorted capscrew holes, loose rims, or broken flanges, can make rebuilding an unsound investment. In such cases, a new part should be installed.

To insure quality workmanship, parts should be restored as closely as possible to original part specifications for hardness and impact resistance. Crawler tractor manufacturers have developed standard recommendations for rebuilding track parts and instituted dealer training programs. This helps assure that reconditioning work meets original part specifications.

Conclusion

Track costs can be cut. Review existing procedures. Does the tractor have the right track shoes and attachments for the job? Is it being operated properly? Is each member of the organization aware of his responsibilities for day-to-day maintenance? Is lubrication being carried out in accordance with manufacturers' recommendations? Are sprockets, rollers and idlers being switched to equalize wear? Are pins and bushings being turned when the limits of track adjustments are reached? Are track and related parts being rebuilt at the most economical time?

If the answer to all these questions is *yes*, the machine owner can be sure he's getting the track life he paid for.



Safety Control Switches Give Full-time, Low Cost Protection

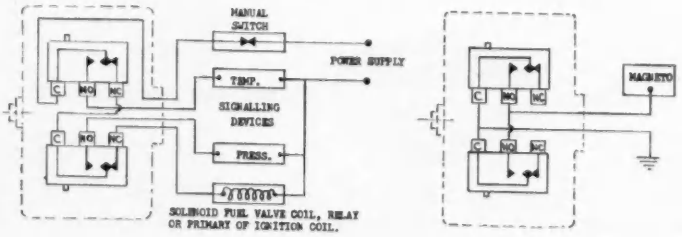
IT is just plain sound economy to install safety control devices to protect diesel engines. The low cost of such long-time protection is saved the first time a switch trips. The use of safety controls depends, of course, on the requirements of the installation. Flexibility is therefore a major consideration. This is an important feature of Amot's new Model 2340. The well-designed, ruggedly-built unit gives dual protection against both high water temperature and low oil pressure.

Model 2340 is built to take vibration. No mounting brackets are required since the unit screws into any convenient connection in the jacket water piping. In the illustration above, the switch is mounted on the water outlet manifold. It might be desirable to mount it even lower on the system to insure functioning in case of some water loss, and to avoid air pockets.

A typical circuit diagram is shown below. Flexibility allows the switch to be wired to either an alarm, flash a warning light or shut down the engine, or a desired combination of the three. Wiring has been simplified through the use of tab terminals. Solderless slip-on connectors are furnished with each unit.

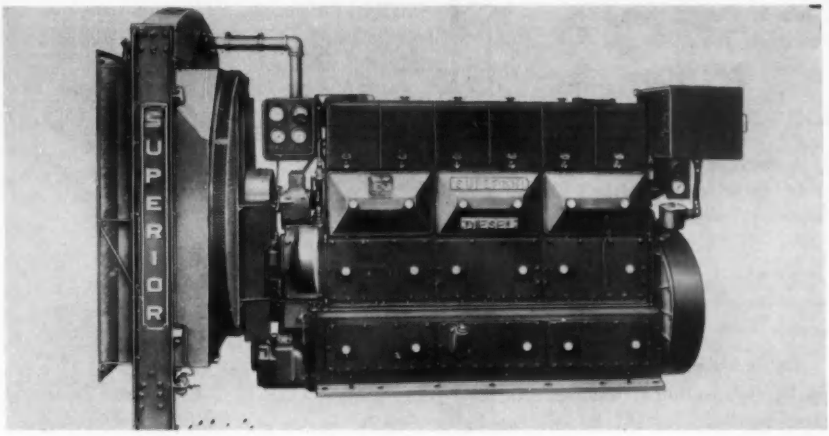
The Amot switch incorporates two single-pole, double-throw snap action switches. The temperature switch is actuated by a wax-type temperature element. A Hycar diaphragm operates the pressure switch. This makes or breaks the circuit (depending on the method of wiring) on starting when there is no lube pressure. The cut-out automatically drops out after the engine is started and oil pressure builds up so that the switch will operate on low oil pressure.

Stacked up against extensive repair costs, or total engine loss, economical safety control devices are a must. They work for you 100% of the time giving protection no engine owner can really afford to be without.



White Announces New PTDS-6M Oil Field Diesel

Design features simplified, compact, heavy-duty engine in 450 - 550 hp range.



JUST announced by White Diesel Engine Division is a new model in their PTD series of diesels for oil well drilling service. Already being sold and put into service in Canadian fields, the engine will be shown here for the first time at the International Petroleum Exposition in Tulsa in May. Fully field-tested, here is a compact power unit for heavy duty oil field drilling rated at 450 hp continuous, 500 hp intermittent and 550 hp maximum.

Compact

A space saving turbocharger arrangement has resulted in an engine that requires only 120 in. base length, including space for the radiator. Vertical, in-line design allows plenty of "in-between" room on multiple engine rigs.

Cylinder block design allows servicing from a stand-up position. Large openings with removable covers give access to all internal parts from both sides of the block allowing inspection, maintenance repairs, even complete overhaul right on the rig.

Open Chamber Combustion

White used open chamber combustion to take advantage of the fuel economy this system gives in diesels. It is the only design that mechanically permits space for wide valve overlap with the piston at the top of its stroke. In turn, this feature allows a blow-through of cooling air which greatly reduces the temperature of upper cylinder walls, piston crown, injector tip, exhaust valve and seat. It should mean longer life to these critical parts.

Other advanced developments in the combustion system improved individual fuel pumps and injectors. The piston dome is designed for best conformance to an optimum fuel spray pattern. Strong iron alloy pistons have long wearing qualities, uniform expansion and have been designed for fast heat transfer. Improved swirl and turbulence are achieved by specially designed contours and streamlined shape of the valve ports.

Spokesman for White says, "operation on low cost fuels and crudes is practical for the entire PTD series because of the open combustion system."

Here are some additional PTDS-6M features. A rigid camshaft, the same used in the higher output PTDS-6, with refined drive details, gives smoother performance. Power flow is smoothed out through the use of a counterweighted, statically and dynamically balanced crankshaft. The engine strains often caused by a crankshaft hung from the cylinder block, have been compensated through the use of a rigid, box-type base which fully supports the shaft. The engine base was especially designed for heavy-duty oil field service.

Two valves in each individually-cast cylinder head means an advantage in simplified rocker arm construction, fewer parts, and less replacement. Dry joint between heads and block minimizes water leakage that sometimes occurs at gasketed surfaces.

White's engineers have combined a high capacity engine-driven oil pump with a new but proven pressure regulating valve to maintain constant full pressure for lubricating oil. It works hot or cold, and at varying engine speeds and loads. No external auxiliary sump is required.

White has produced this new model to give the drilling contractor a better selection of heavy-duty rig power.

OIL AND GAS POWER DIVISION OF ASME 31st ANNUAL CONFERENCE AND EXHIBIT

April is the big month for members of the Oil and Gas Power Division of the ASME for on the 20th, through the 23rd, they hold their 31st Annual Conference and Exhibit at the Shamrock-Hilton Hotel in Houston, Texas.

Greatly augmenting the value of this conference is the annual exhibit at which manufacturers will show new products and have their representatives available for discussion of developments and applications.

On Monday, April 20th there are to be two technical sessions. At the first two papers will be presented: "Development of High Compression Ratio Gas Engine" and "Development and Application of a Small 4-Cycle Turbocharged Gas Engine". At the second technical session three reports will be given: "AIEE-ASME Recommended Specs. for Speed Governing I.C.E. Generating Units;" "Fifth Edition DEMA Standard Practices for Low & Medium Speed Stationary Diesel & Gas Engines;" "Development of ASME-OGP Power Cost Reports." An innovation at this session "What's New?" will allow representatives of exhibitors three minute briefs on new developments. On Monday evening there will be a special lecture of particular interest, "Automation in the Oil & Gas Industry."

On Tuesday the third technical session will cover three more papers: "Turbocharging Development, 2-Cycle Radial Engines for Point Comfort;" "Installation, Operation & Maintenance of Turbocharged 2-Cycle Gas Engine Compressors;" "Non-Destructive Inspection Procedures for Pipeline Equipment."

This year's inspection trips will be a 130 mile tour of Pipeline Pump-

(*Continued on Page 42*)

Steam Speeds Liner Removal

Liners Pulled From Aluminum Blocks on the Rebuilding Stand or in the Chassis — Steaming Does the Trick

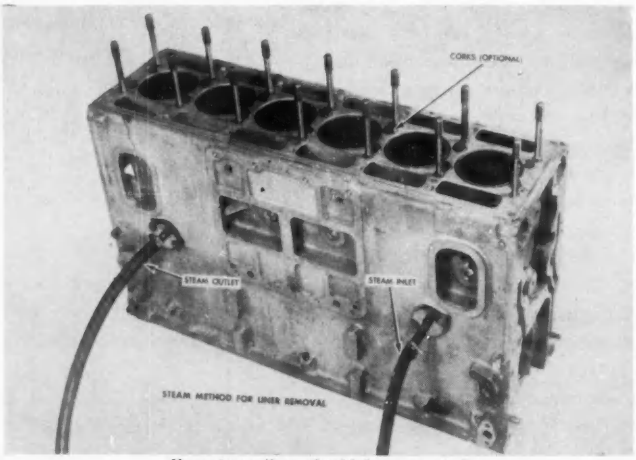
USE of aluminum cylinder blocks is increasing in proportion to demands for weight reduction. Advantages of the lighter blocks are real. For example, in comparing GM's Series 71 engines, the 6V-71 with a cast iron block could be replaced by an 8V-71 with no appreciable increase in weight but with significant increase of somewhere near 80 horsepower.

And as the use of aluminum blocks increases, new service methods keep pace. In the October 1958 issue of DIESEL POWER we covered the removing, checking and installing of liners in aluminum blocks in GM's Series 71 engines. This method applied where the block could be removed. Here is a new technique for liner removal particularly applicable in cases where access to the liners is possible without removing the engine.

The idea is to use steam in the cooling water jackets, expanding the aluminum. Most shops getting into this extensive a rebuilding job have a steam generator or like facility. Once sufficient heat is applied, there's no more problem in removing liners than might be encountered in cast iron blocks. After cleaning the liner ports according to instructions, here is how GM says to do it:

1. Remove the fresh water pump assembly and cylinder block water hole cover.
2. Install two special water hole covers as seen in the illustration.
3. Then, using suitable connectors (short pieces of ⅜ in. pipe are fine) attach a steam line to one hole cover and a short hose to the other as a return drain. This arrangement is also shown.
4. Install the slide hammer-type liner removal tool and introduce steam into the block with sufficient pressure to assure complete circulation. Turn the steam off intermittently to avoid an excess buildup of pressure or loss of steam.
5. After about five minutes, turn off the steam and try the slide hammer to see if the liner can be removed. If not, allow additional steaming time until liners can be pulled.

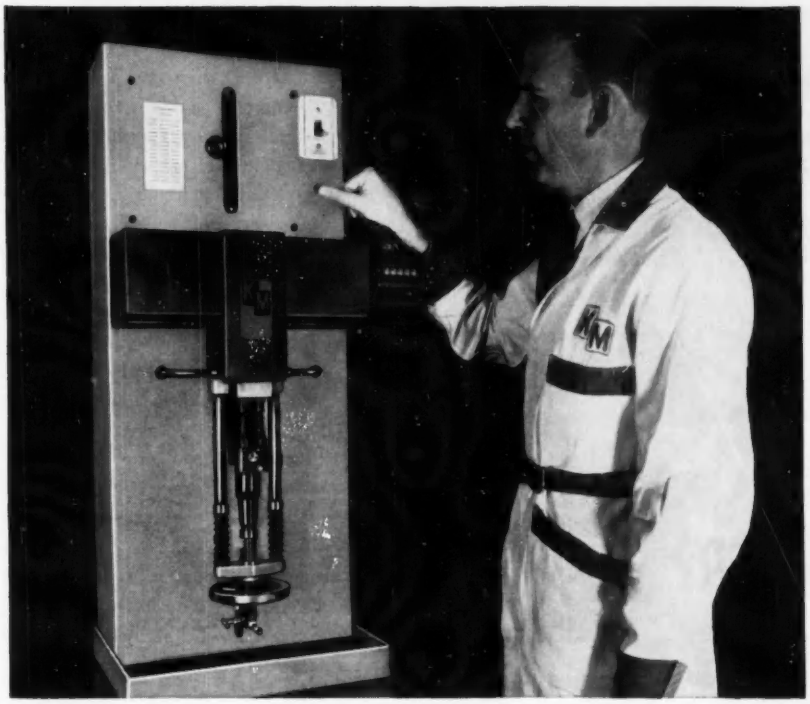
Escaping steam can cause serious burns so watch it when using this method of liner removal. It is a good idea, as an added precaution, to put corks as plugs in the water holes on top of the block. Also, be sure to turn off the steam supply before trying to remove the liners.



How steam lines should be connected.

Better Injectors... Lower Cost...

NEW KENT-MOORE SERVICE EQUIPMENT SPEEDS OVERHAUL AND REPAIR OF GM DETROIT DIESEL INJECTORS



GM Detroit Diesel Injector Comparator Tests performance under simulated operating conditions. Eliminates all guess-work in overhauling and rebuilding injectors to factory specifications. When used with Injector Tester, the condition of all operating parts can be determined. Unnecessary replacement of parts eliminated. With Kent-Moore's J 7041 Diesel Injector Comparator you "road test" GM Injectors right in your shop!

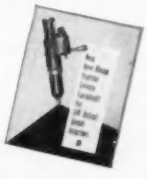
Developed in cooperation with the engine manufacturer, the K-M Injector Comparator measures actual output of new, used or rebuilt injectors by testing them at a fixed speed at a specified number of strokes with filtered fuel supplied at uniform service pressure.

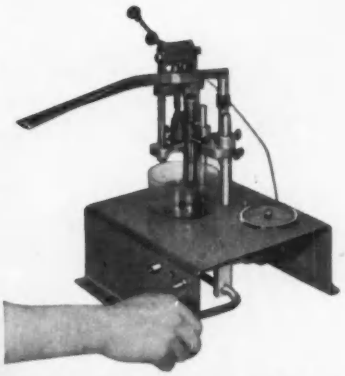
HANDLES ALL SERIES 71 AND 110 INJECTORS

Now you can scientifically test new or rebuilt injectors before building them into the engine—and you can even match-up sets of GM injectors with uniform delivery rates for the best engine performance!

SEND FOR BULLETIN—Write for full data on these and other Kent-Moore special service tools and equipment.

Trade in your old injector tester! K-M Testers purchased within the last three years are worth $75.00 to you! Older models or any make of pump-type testers, bring $25.00 trade-in allowance.





INJECTOR TESTER FOR POPPING, SPRAY PATTERN, HIGH AND LOW, AND PRESSURE LEAKS. The redesigned J 7509 Injector Tester used rigid steel tubing to closely regulate the circuit's volume of fluid. Microfilters eliminate dirt, the greatest single element of injector trouble, and a special cam-operated clamp supplies just the exact amount of pressure for perfect sealing during test. The J 7509 Tester will handle both standard body and offset body Series 71 injectors.

ADAPTER KITS. The J 7510 adapter kit is composed of a quick-clamp and support plate designed specifically for standard body Series 110 Injectors. For the offset body Series 110 Injectors, the J 7511 Adapter Kit is used. These parts are installed on the J 7509 Injector Tester in place of the Series 71 unit.

INJECTOR ASSEMBLY FIXTURE. The J 6868 Injector Assembly Fixture provides a quick-clamp fixture to retain the Series 71 Injectors for repair or reassembly. Jaws are available to fit all Detroit Diesel Injectors.

JAWS AND SUPPORT ASSEMBLIES. Jaws and support assemblies are available to adapt the J 6868 Injector Assembly Fixture to handle all the Detroit Diesel Injectors. J 7505 Standard body Series 110, J 7784 Offset body Series 110, J 7506 All Series 51.

KENT-MOORE ORGANIZATION, INC.

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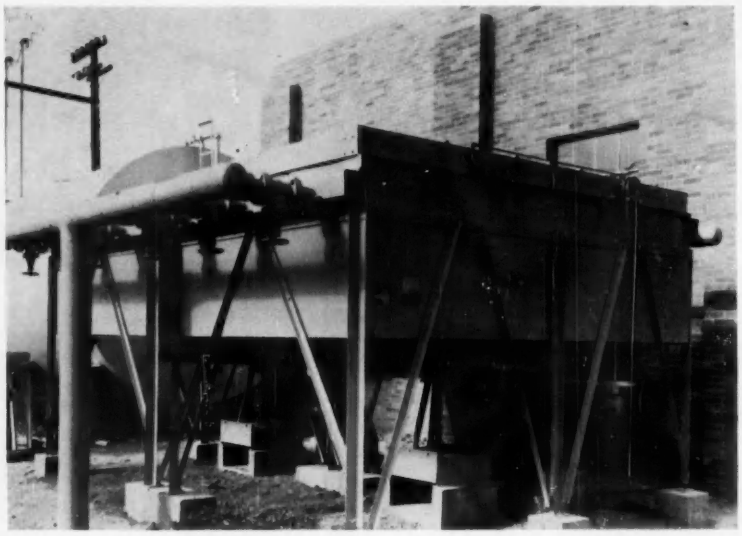
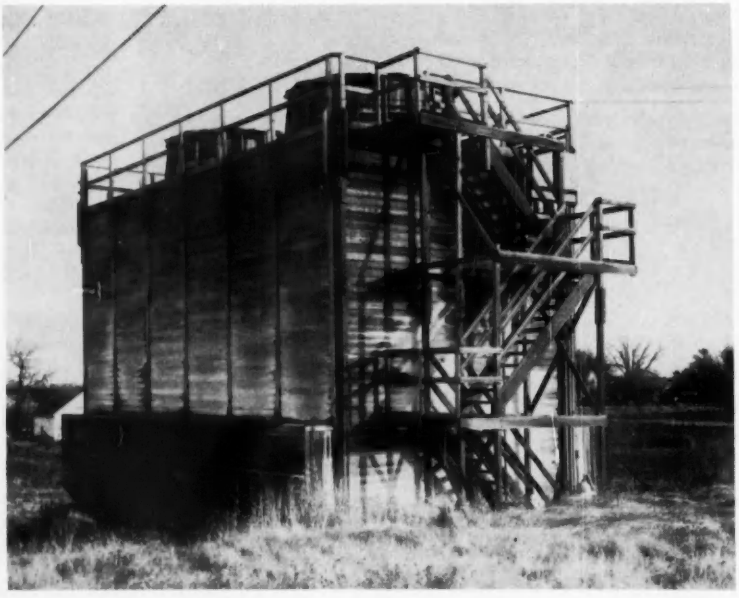
ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT



RADIATOR OR COOLING TOWER?

Choice of a cooling system involves both engineering and economic considerations. Here are the major factors involved, how they affect cooling economy and how to evaluate them.



WHICH is a more economical cooler—the cooling tower or air-cooled radiator? The answer is—it depends on the conditions involved. There are many of them to be taken into consideration.

Liquid temperature, ambient air, desired temperature differential, approach, limit of cooling range to wet bulb temperature, water availability, water quality, space available, first cost and operating and maintenance costs—all play a big part in deciding which is more economical and which should be used.

By evaluating these factors in a recent discussion before the Kansas Association of Municipal Utilities, A. D. Bogus of Young Radiator Co. has shown how the cooling tower and radiator compare in the way of economy. A brief description of the cooling tower and radiator will help in making this comparison.

A cooling tower cools water by evaporation. There is about 1% evaporation of the water circulated to dispose of heat. The cooling tower is generally an enclosed structure where cooling water comes in contact with the moving air passing over strategically-placed wooden filling.

Water cooled by evaporation transfers to the air about 1000 Btu per lb of water evaporated. Air absorbing heat in this manner can cool water below the atmospheric dry bulb temperature with a small volume of water. Thus it is able to dispose of a much greater heat load than would be possible where only sensible heat is involved as in radiator cooling.

The radiator consists of extended heat transfer coils with a fan mounted on a framework. Fluids flow through these coils and fan-blown air moves the surrounding air through the radiator fins for transfer of heat to the air. Air flow and air temperature regulate the heat transfer possible. Dampers or baffles can be used to control air flow. These may be operated manually or thermostatically.

Picking The Right Cooler

The choice between a cooling tower or a radiator depends on the factors previously mentioned. Here's how these factors influence the selection.

Though water is plentiful in some areas it may be of poor quality. If so it must be extensively treated to make it suitable for cooling. Therefore, water must be checked for hardness and corrosiveness. Constant water makeup must also be considered in the overall picture of maintenance and cost. Where water is plentiful, cheap and of good quality, the cooling tower may prove less costly. Where water must be constantly treated, the radiator may be more economical.

Air-cooled radiators will economically remove heat from a fluid when the approach* between the cooled fluid and dry bulb air temperature are 10°F or more. Closer temperature differentials than this mean that radiator size must be increased disproportionately. A cooling tower becomes most economical when a temperature differential between the cooled fluid and ambient is less than 10°F.

With higher temperature requirements such as for engine cooling, the radiator can drop the temperature to a reasonable approach to ambient temperatures. As water inlet temperatures to the engine are raised, the approach is increased and heat transfer increases. Radiator size can be decreased and this type of cooler becomes more economic.

Radiators can be obtained with coils for high-pressure service. They can also cover an unlimited range of cooling services. Proper fin materials can provide the external protection needed in corrosive atmospheres.

A tabulated cost study by the Young Radiator Co., compares the cooling tower and radiator with reference to first cost, operating costs and maintenance costs. See Table 1.

Although for cost estimates in this table a 15-year life expectancy was used for both, normal radiator life expectancy is greater than that of the cooling tower due to action of water on the material used in construction.

Space limitation is sometimes very important. A radiator can be installed anywhere, indoors or outdoors. A cooling tower, however, needs close supervision. There must be no great loss of water vapor blowing from the unit on to near-by buildings and equipment which may be damaged by moisture. Also, cooling tower exposure increases danger of freezing in cold weather. Therefore, it must be protected as much as possible.

Extreme cold weather does not appreciably increase cooling tower efficiency but problems are increased considerably. Cooling towers are subject to ice formation on air inlets in freezing weather. Wood filling saturated with water tends to crack. Ice forming on the air inlet side restricts this area reducing air flow.

Radiator cold weather problems are simpler. If anti-freeze is used there are no freezing problems. If no anti-freeze is used, care must be taken that circulating fluid flow does not become so low that its temperature drops low enough to freeze.

In this case, accurate temperature control can be maintained by using multi-speed motors so the fan can run at low speed during cold weather. Shutters can be provided. In extremely cold weather areas, an enclosure at the radiator base regulates cold air flowing across it and recirculates the air within the housing to prevent freezing.

Conclusion

Economy of radiators as compared to cooling towers, depends on the factors discussed. Yet, in many cases, final selection becomes a matter of engineering compromise plus personal preference, since each type of cooling equipment has its inherent advantages and limitations.

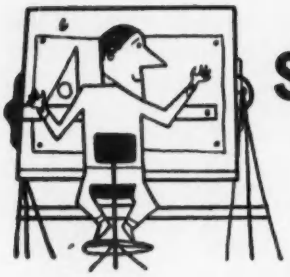
Difference between low range of cooled fluid temperature and wet bulb temperature. It may also be referred to dry bulb temperature.

TABLE I

Estimated Cooling Tower Costs Versus Air-Cooled Radiators

100 Hp Engine — 340 GPM — 170° F water
Wet Bulb Temperature — 75° F — 6000 Hours per year
Dry Bulb Temperature — 100° F

Equipment and Maintenance	Cooling Tower Costs	Air-Cooled Radiator Costs
Cooling tower and basin	$2250	
Raw water pump and motor	300	
Shell and tube heat exchanger	1175	
Air-Cooled radiator & Foundation		$3500
Piping and soft water pump	450	450
Electrical work	400	350
Cost of Equipment	$4575	$4300
Maintenance (5% and 3%)	230	130
Water and Treatment Cost	390	40
Taxes and Insurance	140	130
Maintenance	$760	$300
Fan Horsepower	7.5	15 @ full speed
Pump Horsepower	5	2
Kilowatts—HP x 0.746 / 0.88 motor eff. =	10.6 KW	14.4 KW — 1 speed 10.7 KW — 2 speed
Power costs @ $87 /KW/year (1 speed)	920	1250
Power cost using 2 speed motor on fan		930
Considering annual operating costs Costs Equip. / 15 years + Maint. + Power =	1985	1935 — 1 speed 1615 — 2 speed



service section

Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you

Cummins Ni-Resist Pistons

Improved pistons with a Ni-Resist top ring groove insert are available for 5⅛-in. bore Cummins engines as listed. These pistons have more stock in crown and a redesigned insert to add strength to points of greatest stress.

They can be identified by following part numbers.

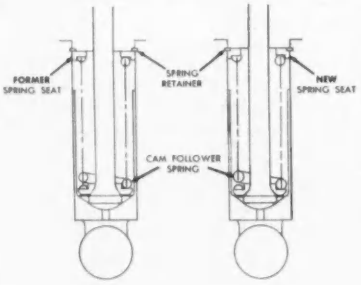
In addition to part numbers, pistons can be identified as shown.

New-style pistons are interchangeable and can be used in mixed sets with old-style pistons. However, where new-style pistons have been used, be sure to remove ridge at top of used liner before putting in old-style piston.

Lower ring grooves of new pistons make ridge 3/16-in. lower, and old-style pistons used without removing ridge would allow top ring to hit ridge and break. It is standard practice to remove liner ridge, but with difference in length of ridge it becomes doubly important.

Engine	New Piston Number	Old Piston Number	Usage
NH, NHH, NVH	103386	21736	Optional
NT	103386	21736	Standard
NHS, VT	103630	21737	Standard
NHRS, NRT	103900	20982	Standard
HR	104240	21740	Optional
HRS	104250	21739	Optional
*NHS	104260	101007	*High-Altitude

*Use at or above 5000 ft. altitude only.



New Cam-Follower Upper-Spring Seat On GM Series 110

A new cam-follower upper-spring seat has replaced former spring seat on all G.M. Series 110 engines. New spring seat is about 1/16-in. thicker than former and has a shoulder in which cam follower spring seats.

Use of new spring seat provides positive locking of snap ring and removes possibility of it escaping its groove in cylinder head. When installing new spring seat, retainer tangs must be installed in recessed section of seat. Accompanying illustration compares use of former and new spring seat.

Impure Water Is Expensive

Using any or all types of well or city water in a storage battery may cause failures, says F. P. Plovick, Field Service Manager for the Delco-Remy Div. of G.M. Only purest water available should be used. Whenever possible, use only distilled water or demineralized water.

Continued use of water containing common minerals such as iron or manganese can ruin a battery in a very short time. Even in cities where water is essentially mineral-free and has been approved for battery use, make water run from tap for a considerable period before using in battery. Water originally mineral-free may absorb iron or other impurities injurious to the battery after standing in household plumbing.

Cat D8 Tractor and No. 583 Pipelayer Steering Clutch Compartments

Until recently, steering clutch compartments of all D8 Tractors and No. 583 Pipelayers have been dry. Drain plugs were installed in bottom of these compartments to permit draining accumulations of moisture and lubricant seepage from other compartments.

Effective with D8 Tractors 14A3740 and 15A1600 and No. 583 Pipelayer 16A200, steering clutch compartments of these machines are filled with seven gallons of same type oil as is used in diesel engine crankcase. This oil serves as a lubricant and coolant for steering clutches and brakes.

In addition, a hydraulic brake booster mechanism is incorporated into brake control linkage to reduce brake pedal pressure requirements when diesel is operating.

Hydraulic brake booster mechanism is similar in construction and almost identical in operation to the steering clutch hydraulic booster mechanism. Pressure oil for both is provided by a pump mounted on rear of diesel. Even without diesel operating (no hydraulic boost), brakes can be applied sufficiently to hold a tractor and loaded scraper on a steep slope. Greater pressure will be required on brake pedals.

New brake bands are not interchangeable with those of earlier D8 Tractors. New bands are larger in diameter to obtain maximum braking area.

$500

In CASH PRIZES

FOR

diesel power

SUBSCRIBERS

All entrants receive a $2.00 book entitled "Fuel Injections Systems."

Merely tell us in your own words of some problem in diesel engine design, operation, application maintenance or engine and equipment sales which you have solved through your reading of Diesel Power. You may have found the helpful idea you needed in a feature article, an advertisement, the editor's page or a news item.

Perhaps you are one who clips items and files them categorically. However Diesel Power has helped you, sit down and write us about it today — your letter may win one of these cash prizes — just in time for vacations:

First Prize	**$250.00**
Second Prize	**100.00**
3 Third Prizes	**50.00 each**

State the problem and how you solved it. Letters will be judged on how the magazine has contributed to your success in handling your diesel work. Your letters will be judged on content only, not on neatness, grammar or composition. Write us in your own words (not over 500 words per letter) as many letters as you want, but cover in each letter only one instance where Diesel Power has helped you.

Everyone who enters the contest will receive the book "Fuel Injection Systems," currently selling at bookstores for $2.00 a copy. This valuable book describes in detail (graphs, charts, cutaways as well as drawings and pictures) the design and operation of all American and most popular European fuel injection pumps and systems. A valuable reference book for every diesel man. Contest is open to all individuals on the Diesel Power circulation list except employees of Diesel Publications, Inc.

To insure full consideration, submit only typewritten letters on your company letterhead. If possible, identify the issue by month and year, title of the article or advertisement to which your letter relates.

All letters must be postmarked before midnight June 30th to qualify for consideration. Publishers of Diesel Power will be the sole judges and all letters become their exclusive property, no entries will be returned.

Address all letters to Contest Editor, Diesel Power, 80 Lincoln Avenue, Stamford, Connecticut.

Winners will be notified by Western Union on July 6th.

Diesel Publications, Inc. 80 Lincoln Avenue, Stamford, Connecticut

industry news

Reunion at Diesel Control

Three old friends met recently in Diesel Control's Wilmington, California plant. Pilot model of Bendix-Scintilla's Type UC unit injector, used in Hendy diesel-powered World War II C-1 freighters, was center of attraction. Impressed by the cut-away job done by a local college for lecture purposes, Bendix-Scintilla's John Davidson, left, suggested that Scintilla mount the unit in a glass case in their New York office. W. F. McNeil, Diesel Control's president, didn't buy the idea. McNeil, who supervised installation of Hendy diesels in Consolidated Steel's Wilmington, California shipyard during the war, purchased the pilot injector from Joshua Hendy Iron Works when that firm was sold a number of years ago, has had it in his stock room ever since. Why? "It reminds me of the days when . . ." John Davidson left empty-handed.

Blast-Hole Drilling on Calumet-Sag Navigation Project

Powered by 6-71 GM Diesel engine, this tractor-mounted Ingersoll-Rand air drill stays well out in front of advancing blasting and dredging crews on Calumet-Sag Navigation project near Chicago. Mobility and efficiency of this unit enables contractor on this phase of the channel widening, Mary Construction Company of Cape Girardeau, Missouri, to average 220 feet of drilled hole per 8-hour day. A charge of about 1100 pounds of explosives is used in each 20 foot hole. Another example of diesel power doing the big job.

Shape of Tomorrow . . .

Figures tell the story as pretty model perched on aluminum engine block fails to balance conventional iron block. Wider use of aluminum blocks must follow in our industry if diesels are to be competitive with gasoline engines in vehicular service. Trend to light metals is growing as indicated by fact that use of aluminum in automobiles has doubled in period 1954 to 1959. Both aluminum block and aluminum forged wheel on which model and blocks teeter are from Alcoa, a leader in the continuing search for new applications of light metals. Vital statistics—model weighs 115 pounds, aluminum block 90, iron block 220 pounds.

new products . Page 44

people and plants . . Page 48

new literature . . . . Page 52

1959 CIMAC Congress Opens June 14 in Wiesbaden, Germany

Theme of the International Congress of Combustion Engines Conference to be held in Wiesbaden, Germany, June 14-19, 1959 will be: "Diesel Engines and Gas Turbines up to 1500 hp—Current Problems Concerning Design, Production, Development and Running at Site." Some 30 papers will be presented at the technical sessions. Provisional programs containing necessary forms for registration will be mailed soon. It is important that registration be made as soon as possible since, due to the large number from many countries wishing to attend, registration closes approximately two months before the meeting. Anyone wishing to attend, or wanting further information on the conference should contact Robert L. Stanley, Secretary-Treasurer, U. S. National Committee CIMAC, Room 403, 2000 K Street N. W., Washington 6, D. C.

Need a Heavy-Duty Diesel Outboard?

GM is taking a direct approach in finding possible engine applications. Typical is the questionnaire circulated at the Motor Boat Show in New York.

Remember the Murray & Tregurtha Harbormaster propelling and steering units that were so useful in World War II? They were a sort of king-sized outboards with heavy-duty capabilities. One common use was for bowering barges built from the Navy "cubes". Now the question is: What is the potential for specialized transon-mounted diesel units in both the pleasure craft and workboat field?

Detroit Diesel, working with Murray & Tregurtha, has developed an experimental outboard diesel propulsion unit for displacement-type boats of 28-ft length and up. The new Series 53 engine was used.

Prototype units feature: (1) easy "package" installation; (2) optional speed ratios; (3) choice of propellers; (4) about 1500-lb weight; and (5) an estimated tab of around

NUGENT SIGHT FLOW INDICATORS
serve New Luxury Liners

Nugent Fig. 1001F Sight Flow Indicators are used aboard Moore-McCormack Lines' new *S. S. Brasil* and *S. S. Argentina* to indicate the flow of liquid through pipe lines.

Two new sea-going resorts, the luxury liners, *S. S. Brasil*, and sister ship, *S. S. Argentina*, have recently joined the Moore-McCormack Lines' fleet serving South America.

Built by Ingalls Shipbuilding Corporation at Pascagoula, Mississippi, both the *S. S. Brasil* and *S. S. Argentina* make extensive use of Nugent Sight Flow Indicators. They are installed in the various lines of piping aboard to indicate the flow of liquids through these lines.

Nugent Sight Flow Indicators have large, double windows to aid visibility. Standard windows are heavy plate glass for ambient temperatures, however Pyrex or Lucite windows are available. A spring-compensated indicator gate swings close to the inside surface of the window, moving in proportion to the flow, and is visible even when the liquid is dark or discolored.

Nugent Sight Flow Indicators may be equipped with electrical contacts to operate a warning bell or light, should liquid flow cease at any time.

If you have piping, through which the constant flow of liquid is essential, Nugent Sight Flow Indicators can be a most economical investment. It will pay you to write for complete details, today.

ESTABLISHED 1897

REPRESENTATIVES IN PRINCIPAL CITIES

WM. W. NUGENT & CO., INC.

3426 CLEVELAND STREET, SKOKIE, ILLINOIS

OIL FILTERS • STRAINERS • TELESCOPIC OILERS
OILING AND FILTERING SYSTEMS • OILING DEVICES
SIGHT FEED VALVES • FLOW INDICATORS

$5000. These units give all the advantages of outboard drive, an important one being full thrust power steering in any direction.

GM wants to know the extent of interest in such installations as a guide to future moves by themselves and Murray & Tregurtha. If you are interested let the Customer Research Staff, General Motors Corp., Detroit, Mich., know.

Judging from the versatility and durability of somewhat similar units during and after the war (surplus units were snapped up), these new and improved models should have tremendous appeal.

"They Don't Make Road Scrapers Like They Used To"

While contractors were improving Highway M-32 in Charlevoix County, Mich, a local farmer trotted out his horse-drawn scraper. This rig helped build the original highway back in 1921.

M-32 was graded and graveled in 1921. Today it's being further modernized. Contractor's equipment includes a 128-hp Caterpillar D7 crawler tractor push-loading a 162-hp "Michgan" Model 110 tractor scraper (both shown). The "Michigan" picks up 10½ cu yd heaped, the horse-drawn scraper about ½ cu yd.

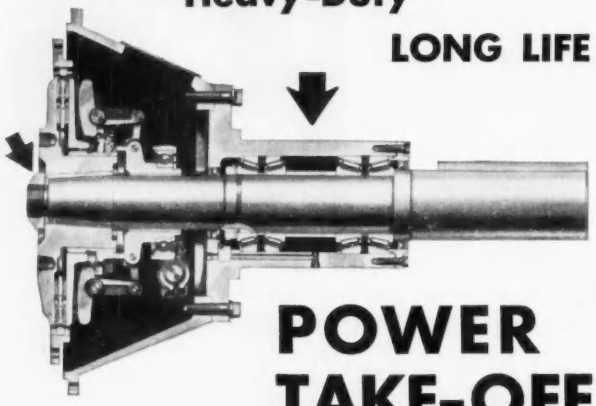
Farmer James Novak modernized his old road scraper by replacing its wooden wheels with steel wheels. He still uses it to grade, move dirt, and cut down little hills on his farm. He maintains that his "2-hp" rig has a few advantages over today's high-hp machines. It goes farther on a bucket of oats, runs quieter, and can find its own way back to the garage at night.

ROCKFORD

OIL FIELD TYPE

Heavy-Duty

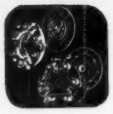
LONG LIFE



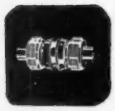
POWER TAKE-OFF

➡ Has 40,000 Hour Main Bearings

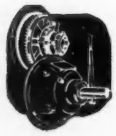
The Timken main bearings in this new ROCKFORD Oil Field type POWER TAKE-OFF are calculated on the basis of 40,000 hours (5-10 Bearing Factor). These bearings are of ample size and capacity to give good service for the life of the engine with which this take-off is used. Your equipment will benefit from the long-life factor of this ROCKFORD extra Heavy-Duty POWER TAKE-OFF.


Small Spring Loaded

Heavy Duty Spring Loaded


Oil or Dry Multiple Disc

Heavy Duty Over Center


Power Take-Offs

Speed Reducers

SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

1301 Eighteenth Ave., Rockford, Ill., U.S.A.

Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

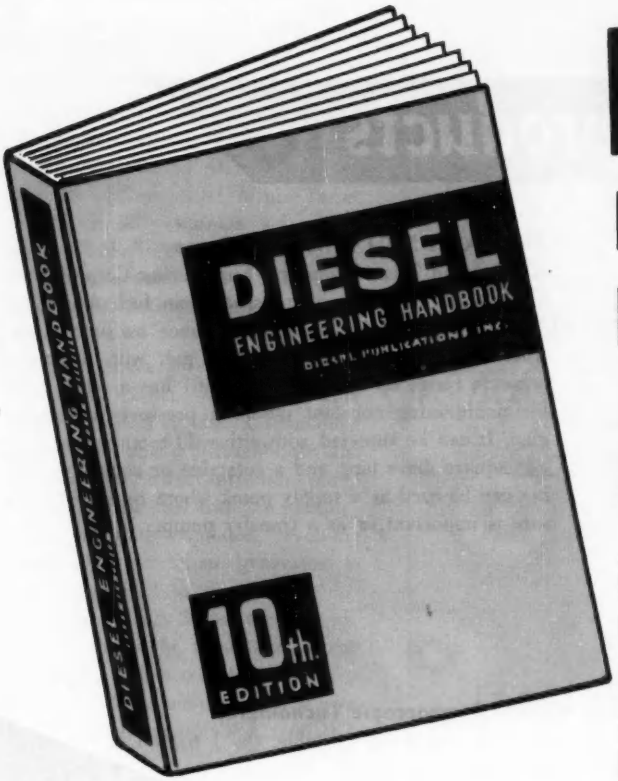
OGP Conference . . .

(*Continued from Page* 34)

ing Stations and a Houston Ship Channel Boat Trip.

The fourth technical session gets under way on Wednesday with two papers: "Lubrication, Sez Who!" and "A Field Study of Gas Engine Lubricants." On that afternoon the fifth session papers will be: "Engine Foundations-Design, Theory & Construction" and "Engine Lubrication & Oil Filtration."

On Thursday the sixth technical session features papers on "Evaluation of Corrosion in Diesel Cylinders", "Engine Waste Heat Utilization in a High Speed Geared Steam Turbine" and "Production Design of a Modern Axial Flow Positive Displacement, Rotary Compressor." After an exhibitor's social hour, the seventh and last technical meeting will hear two final papers, "Mechanical Isolation of Torsional Vibrations in Geared Engine Drives" and "Advantages of a Tailor Made Construction Contract."



READY FOR DISTRIBUTION APRIL 15th

A New, entirely revised edition of the Diesel Engineering Handbook is coming off the presses April 15th.

Over 500 pages — hundreds of illustrations — cloth bound for durability — 31 chapters dealing with every phase of Diesel Engine Theory, Design, Construction, Operation — here they are:

1. The Diesel Engine
2. Engineering Fundamentals
3. Engine Testing & Test Equipment
4. Fuels
5. Combustion
6. Engine Performance & Efficiencies
7. Combustion Chamber Designs
8. Fuel Injection Systems
9. Injection Pumps
10. Injection Nozzles
11. Frames, Cylinders & Lines (Low & High Speed)
12. Pistons & Rings (Low & High Speed)
13. Connecting Rods & Piston Pins (Low & High Speed)
14. Crankshafts, Flywheels & Balancing (Low & High Speed)
15. Bearings (Low & High Speed)
16. Valves, Gearing & Cylinder Heads (Low & High Speed)
17. Air Systems
18. Supercharging
19. Fuel Handling
20. Lubrication
21. Lubrication Systems
22. Cooling Systems
23. Exhaust Systems
24. Starting Systems
25. Governors
26. Dual Fuel & Gas Engines
27. Marine Dieselization, Incl, Gears & Torque Converters
28. Foundations & Installation
29. Maintenance & Periodic Inspection Records
30. Appendix
31. Diesel Engine Specifications

The most comprehensive reference work on Diesel, Dual Fuel and Gas-Burning Engines, Components, Accessories, Operating and Maintenance Procedures published in this country.

INDISPENSABLE for:

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CONSULTING ENGINEERS
OPERATORS
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SERVICE SHOPS
PARTS AND ACCESSORIES
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Known everywhere for its wealth of useful information, this bigger and better Tenth Edition of the DIESEL ENGINEERING HANDBOOK should be within reach of these and all other concerned in any way, every day, with Diesel Engines. A valuable aid in meeting thousands of problems.

Single copies $10 each. Attractive savings may be realized on bulk orders. Prices on request.

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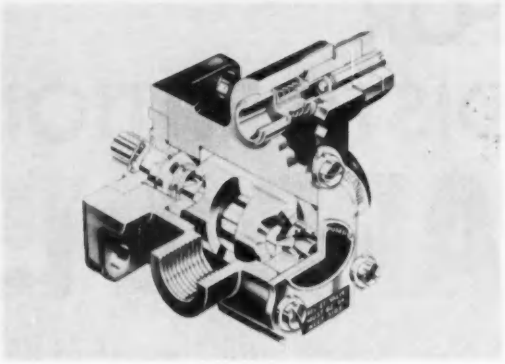


Titan Adds 5501 Series Fuel Pump

Newest in Titan Pump and Engineering Corporation's line of rotary-vane positive-displacement fuel pumps, the 5501 is designed for high performance on most diesel truck and bus engines. Rated 200 gph with discharge pressure range up to 20 psi, the 5501 has a relief valve for maintaining constant pumping pressure to the engine. It can be supplied with either 11-tooth spline or a ¼" square drive tang and a rotatable or square mounting can be used as a supply pump where regulated pressure is important or as a transfer pump.

Kent-Moore's Stroboscopic Tachometer

Self-contained, completely portable, the J 6789 Uni-Tac gives accurate rpm readings without mechanical contact. Kent-Moore Organization's battery-powered probe-type device should be valuable to anyone checking rpm of rotating or reciprocating mechanisms where no provision for mechanical contact is available or is difficult. Instrument uses a controllable intermittent flash of light on the rotating part and automatically registers rpm on a dual speed range (0-1800, 1200-4500 rpm) scale. Uni-Tac is priced comparable to quality hand tachometer sets.

Fullair Control for Fuller RoadRanger Transmissions

Fullair Control is Fuller Manufacturing Company's new gear shifting control unit for 10-speed Fuller RoadRanger Transmissions. Short shift lever on the master control unit moves through the normal shift pattern actuating air valves which release compressed air to a slave unit on the transmission which activates power cylinders to select and engage the desired gear combination. A light on the instrument panel identifies the neutral and in-gear positions of the transmission, light on for neutral and off for in-gear positions. If the light remains on after the shift, gear engagement has not been secured and the driver is warned to repeat the shift. Fuller's standard range selector handle is mounted near the Fullair Control. It is used in the same manner as with standard gear shift levers. New unit's use of air power takes much of the work out of gear shifting. Flexible air lines help to eliminate clearance problems associated with mechanical linkage in tilt cab and COE type vehicles.

New 10 and 15-kw Onan Diesel Generating Sets

A new Series DZB water-cooled, diesel-driven generating plants have been announced by D. W. Onan & Sons Inc., Minneapolis, Minn. These completely self-contained a-c plants are available in either 10 or 15-kw, 50 and 60 cycles 460 v. They are designed for dependable continuous service.

Prime mover for the DZB is the heavy-duty, 3-cyl, 37-hp 1800-rpm Hercules DD-149 diesel. Standard features include a RoosaMaster distributor-type, direct-injection pump with a built-in fuel transfer pump.

An inherently-regulated, revolving armature type Onan generator is direct-connected to the diesel.

The new DZB Series are in addition to the eight new series diesel generating plants recently announced by Onan. These include the following Series units: 50DFA, 60DFA, 75DFB, 100DFC, 125DFD, 150DFE, 175DWF and 200DWF. The figure in each series denotes their kw rating.

These new Onan Diesel generating sets have been developed especially to meet the demands for auxiliary diesel emergency power.

Prime movers for the new Onan electric plants, up to 150 kw are Cummins diesels. In 175-kw and 200-kw units the engines are Waukesha diesels.

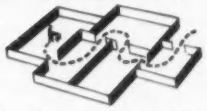
Machinery Sits Tighter In New Non-Shrinking Grout

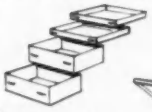
Machinery and structural members are seated more securely in a non-shrinking grouting material introduced by Walter Maguire Co., Inc. Unique feature of this new grout is the use of a special aggregate, Cortland emery, a form of corundum, which is second only to the diamond on Mohs' Scale of Hardness.

Named "Emeri-Grout," the new material actually expands slightly as it sets. Since it is uncommonly ductile, Emeri-Grout will absorb vibration of heavy machinery without breaking down. It is also said to be highly resistant to erosion by water or oil.

FOLLOW THIS MAN!

He's saving time with a new Snap-on *Tool Truck*

Up a stairway on a hurry-up job, nothing to it with the big, 10-inch diameter, semi-pneumatic balloon tires. Emergency repair work across the plant,  compact Tool Truck carries full tool selection to the job. Job in another building, the Tool Truck eases heavy loads over rough pavements or tracks. Drawers are held shut during travel by a padlocked bar.

The new *Snap-on* Tool Truck is invaluable wherever tools or parts transport is needed. Plenty of tool space with four husky drawers.  Upper panel section is partitioned for nuts, bolts, parts. Ample storage space throughout.

A demonstration will prove the Tool Truck's money-saving ability. Call your nearest *Snap-on* branch or write us direct.

SNAP-ON TOOLS
CORPORATION
8064-C 28th Avenue • Kenosha, Wisconsin

new products

A-C Expands Construction Machinery Line

Allis-Chalmers has expanded its construction machinery line with the addition of the Model 145 motor grader. This is an 80-hp, 21,540-lb unit designed to meet market demands for a medium-horsepower and weight motor grader capable of heavy-duty work.

The new grader increases to three the number of models A-C has available in sizes from the 58 hp model D to the 120 hp Model 45 motor grader.

Model 145 tandem-drive motor grader is powered by 4-cyl A-C diesel developing 80 hp at 1800 rpm. It has six forward speeds ranging up to 20.3 mph, and three reverse speeds up to 7 mph.

A-C has also announced a new medium-sized motor scraper, the TS-260. This 44,800-lb unit has 12.5 cu yd struck and 17 cu yd heaped capacity. It is powered by the new A-C 16,000 6-cyl diesel developing 230 hp at 2000 rpm.

The scraper is hydraulically operated. Its source of power is derived from a gear-type pump driven from the rear of the engine crankshaft.

Freon Solvents Eliminate Dismantling Electric Motors For Cleaning

Here's some good news for generating plants, railroads, etc. The cost of cleaning large electric motors might be reduced as much as 75% through on-site use of non-flammable, non-explosive, and virtually non-toxic Freon solvents. Tests conducted by the Du Pont Co. with these solvents have been successful.

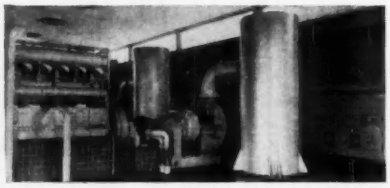
Aside from the cost and safety advantages, DuPont says that Freon solvents will not attack insulating materials and varnishes used on motor windings. In-place cleaning, rather than dismantling of the motor for cleaning, reduces equipment downtime. It also makes more practical a continuing program of preventive maintenance.

As an example of the potential savings, an enclosed 600-hp motor, was cleaned in one day, without dismantling, at a solvent cost of about $80. Previous cleaning cost nearly $400, including dismantling for shipment to an off-plant cleaning and service site. Not computed in the costs, but representing significant additional savings, was labor required in dismantling and reinstalling the motor.

Gas Valve Lubricant

A new gas valve lubricant has been developed by The Alpha-Molykote Corp., Stamford, Conn. The new lubricant, Molykote Type 1102, is a high-temperature, non-melting-point grease fortified with highly purified molybdenum disulfide powder.

This grease is recommended for use as a lubricant for plug cocks of metal, plastics or glass on equipment where reliable lubrication in the presence of gases or liquids is required. It



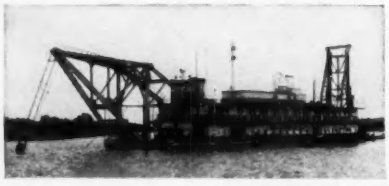
SEWAGE PLANT COMPRESSORS

MAXIM

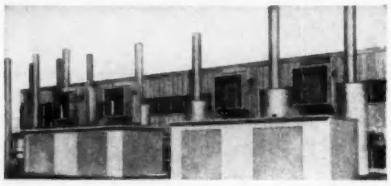
THE COMPLETE SOURCE OF

SILENCERS

For over 50 years, Maxim's main concern has been to engineer the finest silencing equipment possible. Maxim's complete line of silencers makes it possible to select precisely the kind and degree of noise control you need. Put Maxim engineers to work on your special problems, or send for latest bulletins.



MARINE ENGINES



POWER PLANTS

Emhart Manufacturing Company
Maxim Division
Hartford 1, Connecticut

EMHART

Emhart Manufacturing Company, Maxim Division 93
Hartford 1, Connecticut

Please send me bulletins on Maxim Silencers for:

☐ Waste heat recovery
☐ Steam, air or gas discharges
☐ Jet engine exhaust and intake
☐ Internal combustion exhaust and intake
☐ Air compressor intakes and discharges
☐ Blower intakes and discharges

name

company

address

eliminates the gumming formations which usually cause valves to stick.

Quick Cold-Weather Starting

To help fleet and construction equipment owners cut costs, Canton Chemical, Wilmington, Del. has developed a new starting fluid in handy pressurized cans for use in diesels. Chemfoam "Starting Ether" is a low-cost priming fuel designed to give quick starts in cold weather, down to minus 60°F.

Containing a combination of volatile ether, and a premium lubricant, it is said to reduce dilution and wear, minimize the strain on batteries and engine parts, and prevent downtime, towing costs and extra labor.

Versatile Snap-On

Snap-On's newly-designed tool truck is for use where tools must be transported to the job. It can be moved up and down stairs even while fully loaded.

Ease of handling, even in restricted quarters, is achieved by the use of two large rear wheels and two smaller front casters. For transporting tools, parts and equipment, the truck is tipped backward by pushing against a "kick-plate" and simultaneously pulling on the handles.

To provide ample storage space for tools, parts and equipment, this unit has a lower 4-drawer section, a parts storage section, and a work area.

22-Ton Euclid-Easton Rear Dump

A new Rear Dump of 22-ton payload capacity has been introduced by Euclid Div. of G.M. The S-12 consists of an overhung engine-type tractor with an Easton-built variable-wheel base semi-trailer. The tractor is powered by a 218-hp diesel and is equipped with a 5-speed transmission.

Since the tractor is interchangeable with the Euclid S-12 Scraper or the Easton Trailer, the conversion gives flexibility for all types of work at minimum investment.

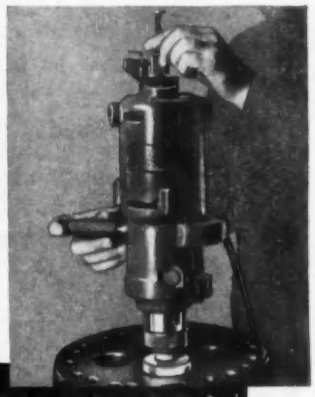
Anti-Seize Sealant

A new "Led-Plate" anti-seize sealing compound. No. 250 "F" is being marketed by Armite Laboratories, of Los Angeles. It is said to stop spiral leaks from large diameter threads and coarse fittings and in welded flanges that have become oval or distorted.

It is especially good for clean-out plugs. It is non-corrosive and non-hardening. It can be used successfully in a wide range of temperatures (−350°F to +2987°F) and pressures to 50,000 psi.

(*Continued on Page 57*)

NOTHING EQUALS THE ECCENTRIC METHOD OF VALVE SEAT GRINDING EXCLUSIVE WITH HALL TOLEDO



Designed Especially for Diesel Service!

Only Hall-Toledo's EDP Valve Seat Grinder can absolutely assure the finest performance results by providing perfect valve seating.

Whether you do your own valve work or have a diesel engine service organization handle it, be certain that HALL-TOLEDO equipment is used for faster, factory approved precision valve seat grinding. The MODEL EDP, especially designed for heavy duty diesel engines, will handle grinding wheels from 2" to 7" diameter. The Model EJ HALL-TOLEDO VALVE SEAT GRINDER is also available to precision grind smaller valve seats.

Write today *for information on the complete Hall-Toledo line for factory production or engine rebuilding work.*

HALL-TOLEDO, INC., 2031 SOUTH AVE., TOLEDO, OHIO

people and plants

Two Move Up At Worthington

E. A. Murray becomes Manager of the newly combined Sales & Service at Worthington's Compressor &

E. A. Murray

Everett L. Case

Engine Division. The departmental merger is a step toward better customer relations. Mr. Murray joined Worthington in 1935. Since 1951 he has been Manager of Compressor Sales.

Moving up into this slot is Everett L. Case, who has served as Assistant Manager of Compressor Sales since 1954. Mr. Case has been with the firm since 1937.

Largest Midwest Distributor To Handle Hercules Line

Illinois Auto Electric Co., largest independent distributor of transportation and industrial supplies in the middle west, has been appointed distributor for Hercules Motors Corp. in northern Illinois and Indiana. This company is already warehouse distributor and service center for over 100 leading lines of transportation parts and supplies.

The 43-year-old company will handle Hercules' entire line of air-cooled and liquid-cooled diesel, gasoline and LPG industrial and automotive engines from 5 to 600 hp.

According to Henry B. Sirotek, IAE vice president and general manager, the Hercules Dept. will be at the company's Forest View Div., 4750 S. Central Ave., Forest View, Ill.

Sales Appointments at Robert Bosch

Truman T. Stevens is the new Sales Manager of the Trade Sales Department at Robert Bosch Corporation. He has been Assistant Sales Manager for the firm since 1956. Richard A. Neece is the new Assistant Sales Manager.

New Representatives for Nugent

Wm. W. Nugent & Co. (Inc.) has announced the appointment of Carlson-Rutledge Co. as their representative for the Cleveland area. The new representatives have an extensive background in the application of Nugent oil filtering and lubricating equipment.

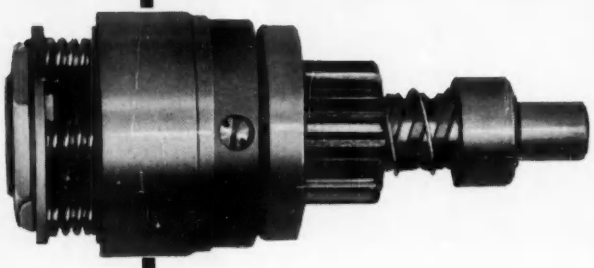
Other news from Nugent is of the appointment of Robert L. Wilkinson, Milton F. Brunner and William C. Stata as Factory Representatives. They will be working with Nugent customers in the field.

for

PERFORMANCE
ECONOMY
DURABILITY

specify

BENDIX STARTER DRIVES



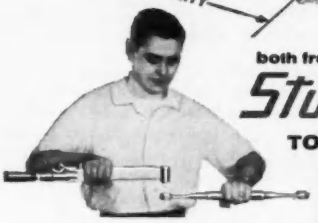
In starter drives BENDIX means QUALITY. That fact, accepted by automotive men for almost half a century, is just as well-known to diesel engineers today. That's why the Bendix* Starter Drive is standard equipment on more diesel engines than any other make. It can be mounted more easily and in more positions. It requires no actuating linkage—the solenoid can be placed in any convenient position. It is simple in design, has fewer parts, needs fewer adjustments. No matter what your type of diesel, you'll be wise to specify and demand the Bendix Starter Drive for outstanding performance and economy. *REG. U.S. PAT. OFF.

Bendix-Elmira, N.Y.
ECLIPSE MACHINE DIVISION

Bendix
AVIATION CORPORATION

NOW... 2 TORQUE Ranges
(to 900 Foot pounds)

both from one
STURTEVANT
TORQUE WRENCH



Now you can do high torque work with a Sturtevant Torque Wrench of normal capacity range—small in size—light in weight—with fine increment markings and moderately priced.

With a new Multi-range, Multi-purpose Adapter you can step up the capacity of your Torque Wrench to a new high range and you can plug in any drive end you want . . . Box wrench, ratchet, drive square for sockets.

All drive end accessories are interchangeable and stock items.

In this way each Sturtevant Torque Wrench effectively equals two complete sets of ordinary single purpose Torque tools.

WIDE CHOICE OF INTERCHANGEABLE DRIVERS

Only Torque wrenches with the Sturtevant patented pivoted handle can be accurate with adapters.

write for No. SD-77 catalog sheet

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

KIENE®
DIESEL
indicator valves

OPERATES AT PRESSURES UP TO 10,000 PSI

Kiene valves have effective gas seal both open and closed without packing or glands. Operate against pressure — will never blow open. Small and rugged — 4¼" in length with only 3¼" circle of space for attachment. Kiene valves give better service under the most severe conditions. Standard indicator plug and wing nut connection.

Furnished with male ½" NPT engine connection. Other threads on order. Adaptations for most diesel locomotive engines.

SEND FOR BULLETIN V-10

KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

New Assignments at American Bosch

Richard C. Keane

Robert M. Whelan

Richard C. Keane has been named Manager All Product Sales for American Bosch Division, American Bosch Arma Corporation. He will be responsible for sales activities on all non-military products both for OEM and the aftermarket. Previously Manager of Manufacturers Sales, Mr. Keane has been with American Bosch since 1950.

Robert M. Whelan's new assignment is that of Manager of After-Market Sales. He too joined the company in 1950 as a Service Sales Representative before transfer to American Bosch headquarters at Springfield, Mass.

Sales Manager Of Koppers Division

Thurman F. Naylor is now sales manager of the Metal Products Div. of Koppers Co., Inc., Baltimore, Md., manufacturing piston rings, sealing rings, couplings and other metal products. He will be responsible for district sales operations, development and administration of sales training programs and direction of contract sales.

Mr. Naylor, joined Koppers in 1942. After serving in the Air Force he returned to Koppers and was assigned to engineering. He was named a buyer in 1948, sales engineer in 1949, manager of the contracting section in 1951 and assistant sales manager in 1955.

Assistant V-P For Industrial Sales At Gould-National

Harvey N. Stover has been promoted to assistant vice president for industrial sales by Gould-National Batteries, Trenton, N. J. He was formerly chief engineer, and later assistant general manager, of the battery division of the Philco Corp.

In 1947 when Philco sold this division to Gould-National, Stover was appointed coordinator of engineering. Later he was made manager of telephone sales.

R. G. Patterson Dies

Those who knew Robert G. "Bob" Patterson will be saddened to hear that he died suddenly in Florida on February 6th at the age of 67. Well known to engine rebuilders, and many in the automotive service industry, he has been, since 1932, executive vice-president of the Automotive Engine Rebuilders Association, Indianapolis, of which he was also twice president.

LOOK for this Seal of the ASSOCIATION of DIESEL SPECIALISTS when you need Specialized Service for your engines.

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symbolizes Know-How—Modern Facilities—Ethics
guarantees work performed by Factory-Trained Technicians using Factory-Approved Methods with Best Materials

Listings below are available to ADS Service Members desiring to participate in this Directory. Code letters in each listing indicate the Specialized Sales and Services offered by each Member Shop. Code symbols are below.

F—Fuel Injection Equip. A—Engine Accessories & Specialties C—Engine Components & Parts
G—Governors T—Specialized Tooling & Test Equip. E—Electrical Equipment

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DIESEL FUEL INJECTION SERVICE
365 N. Royal Street
F A C Mobile, Alabama
G T E Tel: HE 2-7513

ARIZONA

PERKINS DIESEL SERVICE
747 South Country Club Drive
F A C Mesa, Arizona
G T E Tel: WOodland 4-5273

CALIFORNIA

McKINLEY CORPORATION
2196 Palou Avenue
F A G San Francisco 24, California
T E Tel: MI 8-1665

DIESEL CONTROL CORPORATION
226 No. Marine Avenue
F A C Wilmington, California
G T Tel: TErminal 4-8516

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F A G Hartford 14, Conn.
T E Tel: JA 5-3401

CLARK-SON CO., INC.
354 Davenport Avenue
F A C New Haven, Conn.
G T E Tel: STtate 7-4152

FLORIDA

DADE DIESEL COMPANY
2717 N.W. 54th Street
F A C Miami 42, Florida
G T Tel: NEwton 4-3063

FLORIDA DIESEL & ELECTRIC CO.
1930 No. Miami Avenue
F A G Miami 32, Florida
T E Tel: FRanklin 1-7691

GEORGIA

AUTO ELECTRIC & MAGNETO COMPANY
477 Spring Street N.W.
F A G Atlanta 8, Georgia
T E Tel: JAckson 3-5831

ILLINOIS

ILLINOIS AUTO ELECTRIC CO.
2011-37 Indiana Ave.
F A C Chicago 16, Ill.
G T E Tel: CA 5-4444

KENTUCKY

DIESEL INJECTION SERVICE CO.
805 Mulberry St.
F A C Louisville 17, Ky.
G T E Tel: MEirose 5-7731

LOUISIANA

WOMACK BROTHERS DIESEL SERVICE
3983 Airline Highway
F A C Baton Rouge, Louisiana
G T E Tel: ELgin 7-9666

VAUGHAN & BUSH, INC.
605 West First Street
F Bossier City, La.
Tel: 5-7404

GERHARDT'S INC.
1917 Jefferson Highway
F A G New Orleans 21, La.
T Tel: VErnon 3-7254

JOHN M. WALTON, INC.
1050 Carondelet Street
F A C New Orleans 13, La.
G T E Tel: JAckson 5-0556

MAINE

EASTERN DIESEL SERVICE COMPANY
997 Congress Street
F A G Portland, Maine
Tel: SPruce 3-1082

MARYLAND

MECHANICAL EQUIPMENT CO.
2140 Hartford Road
F A G Baltimore 18, Md.
T Tel: Tux 9-7607

PARKS & HULL AUTOMOTIVE CORP.
1033 Cathedral Street
F A G Baltimore 1, Md.
T E Tel: SA 7-8383

MASSACHUSETTS

BOSTON FUEL INJECTION & ENGINE SERVICE CO., INC.
263 Northern Avenue
F A G Boston, Mass.
T Tel: Liberty 2-6646

W. J. CONNELL COMPANY
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F A G N. Upper Falls 64, Mass.
T E Tel: DEcatur 2-3630

C. A. KROHNE & SONS
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G T E Tel: RE 2-7441

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F A T Detroit 2, Michigan
E Tel: TRinity 2-2200

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F A C Hibbing, Minn.
G T E Tel: AMherst 3-5725

DIESEL SERVICE COMPANY
2509 East Lake Street
F A C Minneapolis 6, Minn.
G T E Tel: PArkway 1-5065

MISSISSIPPI

WOMACK BROTHERS DIESEL SERVICE
1321 So. Gallatin St.
F A C Jackson, Mississippi
G T E Tel: FLeetwood 5-3439

MISSOURI

DIESEL FUEL INJECTION SERVICE, INC.
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F A G St. Louis 25, Mo.
T Tel: VErnon 2-2121

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A & D DIESEL SERVICE, INC.
145 — 21st Street
F A G Brooklyn 32, New York
T E Tel: STerling 8-4222

HETTRICH ELECTRIC SERVICE, INC.
1032 Elliott Street
F A C Buffalo 9, New York
G T E Tel: GRant 7602

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DIESEL INJECTION SALES & SERVICE
1625 North Tryon Street
F A C Charlotte, N. C.
G T Tel: FRanklin 5-4152

SANDERS DIESEL INJECTION & HYDRAULIC SERVICE
122 Atando Avenue
F A G Charlotte 6, N.C.
T Tel: ED 4-8225

DIESEL INJECTION SALES & SERVICE
3015 Hillsboro St.
F A C Raleigh, N. C.
T G E Tel: TE 4-5553 TE 4-2316

ASSOCIATION of DIESEL SPECIALISTS, INC.

For information contact:
S. E. Franklin, Secretary, P. O. Box 1116, Wilmington, Calif.
Next Meeting—Sherman Hotel, Chicago, September 17-18-19-20.

NORTH DAKOTA

MIDLAND DIESEL SERVICE & ENGINE CO.
25 — 28th St. S.W.
F T Fargo, North Dakota
Tel: ADams 2-5578

DIESEL SERVICE COMPANY
Highway 83 South
F A C Minot, North Dakota
G T E Tel: 6-8219

OKLAHOMA

AMERICAN ELECTRIC IGNITION CO.
124 N.W. Eighth Street
F A C Oklahoma City, Oklahoma
G T E Tel: FOrest 5-6494

OREGON

AUTOMOTIVE PRODUCTS, INC.
1708 S.E. Grand Avenue
F A G Portland 14, Oregon
T E Tel: BElmont 4-5241

PENNSYLVANIA

PENN DIESEL SERVICE CO.
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T Tel: KI 5-8530

PENN DIESEL SERVICE CO.
27th & North Church Streets, RD#1.
F A C Hazleton, Pa.
G T Tel: GL 4-6771

GENGLER'S DIESEL SERVICE & SALES
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F A C Mount Carmel, Pa.
G T E Tel: 1261 & 1262

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F A C Philadelphia 37, Pa.
G T E Tel: Pioneer 3-3773

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BARNES-RHODES COMPANY
401 Chestnut Street
F A G Chattanooga 2, Tennessee
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MAGNETO & DIESEL INJECTOR SERVICE
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E Tel: TU 2-8662

MAGNETO & DIESEL INJECTOR SERVICE
6931 Navigation Blvd.
F A T Houston 11, Texas
E Tel: WA 1-4830

WOMACK BROTHERS DIESEL SERVICE
123 West Carolina St.
F A C San Antonio, Texas
G T E Tel: LE 2-1182, LE 4-5445

VIRGINIA

DIESEL INJECTION SALES & SERVICE, INC.
808 Union St.
F A C Norfolk 10, Va.
T G E Tel: MAdison 2-3103

DIESEL INJECTION SALES & SERVICE, INC.
910 North Boulevard
F A C Richmond, Va.
G T Tel: EL 8-8170

DIESEL INJECTION SALES & SERVICE, INC.
1016 Delaware Street
F A C Salem, Virginia
T G E Tel: DU 9-7296 & DU 9-7297

WASHINGTON

SEATTLE INJECTOR & ELECTRIC CO.
2706 2nd Avenue
F A C Seattle 1, Washington
G T E Tel: MA 3-1135

WISCONSIN

FUEL INJECTION & ELECTRIC, INC.
932 No. Jackson St.
F A G Milwaukee 2, Wisconsin
T E Tel: BRoadway 2-0818

ALASKA

VAN'S DIESEL SERVICE
119 Second St.
F A C Juneau, Alaska
E Tel: 6-1670

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Cleveland 7, Ohio

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Rockford, Illinois

ADS MEETING OUTSTANDING

In mid-February, members of the Association of Diesel Specialists met in Hartford, Conn. From a technical viewpoint and as regarding attendance, it was the most successful meeting of this 2-year old Association. Present membership comprises 76 service member firms and 13 manufacturer members.

Out of this membership, 51 companies were represented by 118 persons. In addition, 18 prospective members had 21 persons in attendance. The total attendance of 138, representing all parts of this country and Canada, tops the previous meeting held in Chicago in September, 1958.

American Bosch Div., American Bosch Arma Corp. and the Hartford Machine Screw Company were hosts during a full day of inspection trips. New expanded facilities of both organizations for manufacturing and testing were seen.

The technical program was tailored to the needs of these business men. Technical discussions on an electric load-sensing governor as applied to RoosaMaster pumps, turbocharger application and maintenance and calibration of GM injectors were presented. On the business side, product liability insurance and methods of inventory control were discussed. At a panel discussion, those attending had opportunity to quiz a panel of experts on various subjects.

Election of officers also took place. New officers of the Association are: President—Henry Sirotek, Illinois Auto Electric Company, Chicago; Vice President—M. A. Gerhardt, Gerhardt's, Inc., New Orleans; Secretary—S. E. Franklin, Diesel Control Corp., Wilmington, Calif.; and V. J. D'Aversa, A & D Diesel Service, Brooklyn, N. Y. Five new Directors were also installed.

new literature

Features of Rubber Mountings Described

A bulletin describing the vibration isolation and heavy-shock absorption features of center-bonded mountings is now available from Lord Mfg. Co. Bulletin No. 712 includes data on patented design features, installation, performance and specifications of both compression-type and shear-type mountings.

The mountings are specially engineered and precision made for flexible suspension systems in mobile, transport-mounted or portable equipment subject to damaging vibration and shock. They are adaptable to base- or frame-mounted assemblies such as automotive engines, transfer cases, radiators, cabs, fuel tanks, hoods, railroad refrigeration systems, railroad undercar accessories, engine generator sets and marine engines.

Fasteners Detailed In Bulletin

An 8-page, bulletin by the Standard Pressed Steel Co., describes their complete line of standard precision industrial fasteners. Included are socket screw products, pressure plugs, locknuts, spring pins, dowel pins and steel collars.

The bulletin is packed with specification information on the company's Unbrako, Flexloc, Sel-Lok and collar lines. It details basic data on types, sizes, threads and plating as well as design features and application information.

Tables supplemented by sketches identifying each item give specification details on materials, threads and size ranges.

Expanded Line Of Manometers

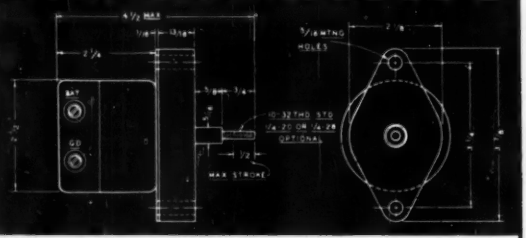
The redesigned and expanded line of well-type manometers by King Engineering Corp. are covered in detail in their Catalog 2008. These manometers are for measuring pressure, vacuum, and differential pressure.

Models covered include: single-tube manometers with low well for measuring gauge or differential pressure, with raised well for measuring both presure and vacuum, and with raised well for measuring absolute pressure; a flometer manometer, with 3-valve manifold and return well; an 8-scale instrument test manometer; multi-tube manometers with fixed-position individual wells and 2 to 20 tubes; and multi-tube models with fixed or adjustable common wells and 5, 10, 15 or 20 tubes.

Magnus Cleaning Equipment

Magnus 215-D, a new liquid compound, has been especially formulated by the Magnus Chemical Co., Inc., Garwood, N. J., for the heavy-duty requirements of steam cleaning trucks, tractors, scrapers, draglines, derricks and other industrial machinery. It is said to have excellent detergency and wetting action for rapid penetration, emulsification and dispersion of thick,

D.C. SOLENOIDS



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CYCLES
Not to exceed 6 per minute

PULL
Approximately 10 lbs. over ½" stroke

WEIGHT
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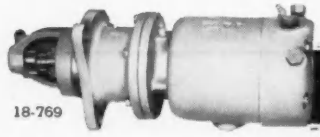

Write for new Air Starting bulletin Form 5094D.

18-769

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dirty, greasy deposits from metal surfaces.

The equipment div. of Magnus has also put on the market a small, low-cost agitating cleaning machine designed for thorough, economical and fast cleaning of diesel fuel injection system parts.

This Magnus Miji Lif series, both in standard and senior models, is air powered (not air agitated) and works off the user's air line.

Literature can be obtained on both products. Just use the Reader Card.

Catalog Covers 27-Ton Euclid Rear Dump

Euclid Division of General Motors has issued a 16-page catalog on their new Model R-27 rear dump hauler for heavy construction, mines, quarries and industrial operations. Well illustrated with cut-a-way views of all major components and on-the-job pictures, this booklet will give you specs covering the complete machine. Optional engines in the R-27, 325-hp General Motors Diesel or Cummins 335-hp Diesel. If you are in the market for a heavy hauler a copy of the catalog is available through our reader service—just mark the card accordingly.

Two ASME Reports Available

American Society of Mechanical Engineers "Gas Turbine Progress Report," selling for $5.00, reviews the past 6 years of progress in this field, covering materials development, advances in cooling, fuels, cycle components, compound piston-and-turbine engines and progress in various engine applications . . . As mentioned previously on these pages the "1957 Report on Oil and Gas Engine Power Cost, priced at $3.00, is also available from the Society. This is the 28th Annual Report containing data for 1956 and previous years supplied by 104 oil and gas engine generating plants. Report covers much valuable information on each plant such as cost details, facts on engines, fuels, maintenance and repair. Both publications may be purchased from the Society at 29 West 39th St., New York 18, N. Y.

Special Equipment For A-C Crawler Tractors and Motor Graders

"Special Equipment for Allis-Chalmers Crawler Tractors and for Allis-Chalmers Motor Graders" is the title of a new 12-page, two-color catalog (MS-1189). It is published by the Construction Machinery Division, Allis-Chalmers Manufacturing Company.

Pictured and explained are attachments and accessories Allis-Chalmers can supply to increase versatility and working capabilities of crawler tractors and motor graders. Also described are accessories that add to operator comfort and safety under normal or unusual working conditions.

Flexible Metal Hose for Diesel Installations

Solution to your problems with flexation and vibration in diesel pipeline connections might be flexible metal hose. Allied Metal Hose Company's data sheet 10-X-552 contains helpful information on the firm's flexible steel corrugated hose for diesel engine exhaust, air intake and oil lines. For your copy use our reader service card.

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Branch Offices: 643 7th Street, San Francisco, California
4937 West Belmont Avenue, Chicago 41, Illinois
400 South Edgewood Avenue, Jacksonville, Florida
Canadian Distributors: Joseph Lucas (Canada) Ltd.
Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec
AP 935

new literature

Blackmer Bulletins

A revised 24-page bulletin 20 by Blackmer Pump Co., has 19 tables to aid in the selection of power-driven pumps for a wide variety of applications. The bulletin also contains a 6-step selection procedure for choosing the most suitable pump for a given application. This is prefaced with a brief outline of the eight primary factors involved in the selection of a power-driven pump.

Rotary pumps for bulk handling of petroleum products, and many industrial liquids are described in Bulletin 100. It covers three basic lines, designated as X, XS and XU, in sizes from 1¼ to 6-in. All are of the sliding-vane type, equipped with external anti-friction bearings.

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FEATURES All brass construction, nickel finish, cork insulation.

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"O" Ring Design and Application Data

Need information on "O" rings for static or dynamic application? New bulletin published by The Garlock Packing Company goes into detail, including construction and principles of sealing. Twenty-page booklet should be of much interest to both the designer and user, a ready source of information on this style of packing.

Parker's New Hose Assembly Line

A line of hose assemblies with permanently attached ends for industrial applications just announced by Parker Fittings & Hose Div., Parker-Hannifin Corp. is covered in their Bulletin 4501. The assemblies, known as Krimp-lok, are complementary to the company's line of reusable Hoze-lok fittings and industrial hose.

Featured are wire inserted woven rayon, rayon braid, steel wire single and double braid, and steel wire spiral reinforced hose for low, medium and high pressure hydraulic and pneumatic applications.

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GM Diesel All-Purpose Power Line-Up

Twelve-page illustrated brochure describes GM industrial and automotive engines, covering single, multiple and turbopowered units ranging from 20 to 1650 hp in three cylinder sizes. Power ratings and overall dimensions on over 100 inline, "V" and turbopower models are given. Four new Series 53 engines in the 20 to 195 hp range are covered.

Twin Disc Specification Bulletin

Bulletin 314 gives condensed specifications on all Twin Disc Friction and Fluid Drives. Twenty pages of engineering data, schematics and dimensions are well organized with all information on a particular unit on one page. Products covered include mechanical and air-actuated friction clutches; power take-offs; reduction gears, fluid couplings; single and three-stage torque converters; marine gears. Use our reader's service card to order your copy.

Data On Synchronous Generators

Planning for diesel-electric installation? You'll want Electric Machinery Manufacturing Company's product publication 2100-PRD-254 describing new line of high-speed generators. E-M a-c generators are built in either single or three-phase ratings of 187 kva and larger, will operate at either 60 or 50 cycles. Single and 2-bearing types are available.

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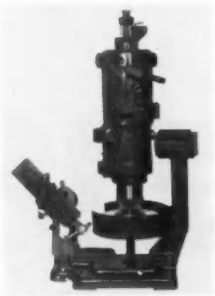
new products

(Continued from Page 47)



Hall-Toledo Improved Eccentric Valve Seat Grinder

The Model EDP valve seat grinder made by Hall-Toledo, Inc., Toledo, O., gives more efficient and economical operation than its predecessor. Improved micrometer feed screw gives complete control of the grinder at all times. Because of this and the eccentric grinding principle, the seat can be ground to a finished condition within 0.001-in. runout the first time. This eliminates constant removal of the grinder to check work progress.

The Model EDP handles seats ranging from 1½ to 7-in. Valve seats can be narrowed at the top or at the "choke" without jamming and breaking the wheel or without the use of extra cutters or special tools.

A smaller Model EJ eccentric valve seat grinder operates on the same principle and handles a grinding wheel from ⅞ to 3-in.

M-R-S Introduces 38-cu yd Scraper Combination

M-R-S Mfg. Co. of Flora, Miss., has introduced a 38-cu yd struck, 48-cu yd heaped, capacity scraper combination. It consists of the M-R-S 250 tractor and the hydraulic-powered M-R-S 250HW scraper.

The 600-hp Cummins-powered M-R-S 250 tractor tows the scraper at up to 34 mph with a substantial power reserve for maximum gradability. The tractor has big, low-pressure drive tires and an extra traction-producing M-R-S hydraulic weight transfer feature. It provides a high degree of drawbar effort to assist the pusher equipment to load the big 38-cu yd scraper in minimum time and distance.

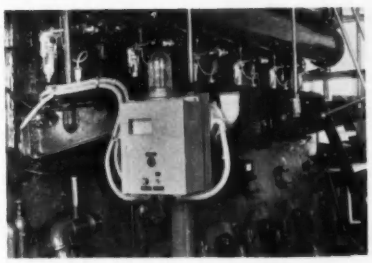
Unified Control Center For Diesel Generators

A complete diesel-generator control center incorporating generator switchgear, Trans - O - Matic automatic transfer switch, engine start control, and battery charger has been integrated into a single cabinet. The unit, developed by the Lake Shore Electric Corp., Bedford, O., can be engine or wall mounted. It is available in capacities to 800 amp, 600-v, with interrupting capacities to 50,000 amp, rms.

Every effort has been made to shrink about 16 sq ft of individual controls into a 51 x 34 x 11-in. NEMA type-1 enclosure. This is done by adapting the emergency circuit breaker in the Trans-O-Matic switch for overload protection in the switchgear circuit. Thus, two breakers are made to do the work of three used in separate controls.

The new indicators can be easily reset in the field for high or low flow ranges.

Temperature Scanners



At the Mantua, Ohio, pumping station of the Buckeye Pipe Line Co., each of four large diesel engines is protected by a new scanner, developed by Assembly Products, Inc., Chesterland, Ohio.

The scanners guard against abnormal temperatures in cylinder exhausts. Too much heat means excessive load on cylinders and can lead to scoring, pitting and other costly damage. Besides the red alarm lights, these scanners have rear-mounted klaxon horns.

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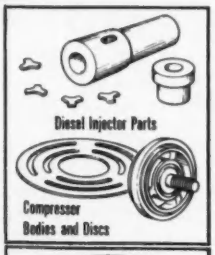

Grooved lap plate permits lapping of compressor bodies without removing stud.

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advertisers index

Albertson & Company, Inc.	22, 23
Allis-Chalmers Mfg. Co.	14
Association of Diesel Specialists	50, 51
Bell Diesel Research	56
Bendix Aviation Corp., Eclipse Div.	55
Bosch, Robert Corp.	27
C.A.V. Ltd.	48
Cooper-Bessemer Corp.	2nd cover
Crane Packing Company, Lapmaster Div.	58
Delco-Remy Div., G.M. Corp.	6, 7
Diesel Engineering Handbook	43
Diesel Plant Specialties Co.	56
Diesel Publications, Inc.	39
Garrett Corp., AiResearch Div.	31
General Motors Corp.	
Delco-Remy Div.	6, 7
Harrison Div.	4
Hall-Toledo, Inc.	47
Harrison Radiator Div., G.M. Corp.	4
Hercules Motors Corp.	3
Hilliard Corp.	56
Ingersoll-Rand Co.	57
Interstate Diesel Svc., Inc.	58
Kent-Moore Organization, Inc.	35
Kiene Diesel Accessories, Inc.	49
Lix Corporation	58
Lovejoy Flexible Coupling Co.	52
Maxim Silencer Div., Emhart Mfg. Co.	46
Nugent, Wm. W. Co., Inc.	41
Rockford Clutch Div., Borg-Warner Corp.	42
Sealed Power Corp.	4th cover
Sharples Corp.	18
Snap-On Tools Corp.	45
Standard Oil Co. of California	10
Standard Oil Co. (Indiana)	3rd cover
Sturtevant, P. A. Co.	47
Synchro-Start Products, Inc.	57
Wilkening Mfg. Co.	1
Wyman-Gordon Co.	2
Zollner Corporation	8

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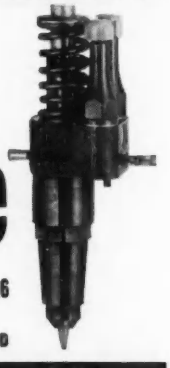

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STANODIESEL Oil M helps keep diesels clean and running smoothly at Princeton, Missouri

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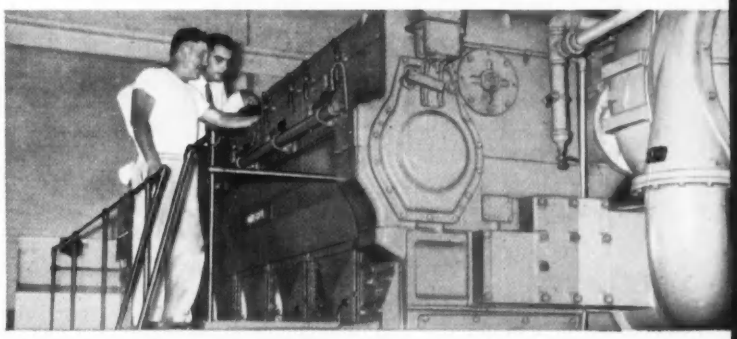
What you can do: Find out more about how STANODIESEL Oil M can deliver service in your plant. Ask for more information from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

Quick facts about
STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.



Darrel McCormick, Standard Oil lubrication specialist and William Rutledge, plant superintendent, inspect 1,440 hp diesel in Princeton, Missouri plant. Darrel is an experienced hand at this work. He has an engineering degree from Vanderbilt University plus four years' experience in industrial lubrication work at Standard Oil. He has also completed the Standard Oil Sales Engineering School.

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